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FOURTH SEMI-ANNUAL REPORT of the US AEC

NEW LEGISLATION to Replace the McMahon Act
An Editorial from Nucleonics

COMMITTEE ON CLEARANCE, FAS
Some Individual Cases of Clearance Procedures

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Bulletin of the Atomic Scientists

Volume 4 Number 9

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HISTOPATHOLOGY OF IRRADIATION FROM EXTERNAL AND INTERNAL SOURCES

EDITED BY
William Bloom, M. D. Professor of Anatomy, Department of Anatomy and Institute of Radiobiology and Biophysics, University of Chicago.

This is the first definitive volume describing the histopathological and cytological effect of total body irradiation by a wide range of radioactive agents. It compares the histological changes that result from various types of radiation originating externally and internally. Gives aids in establishing "tolerance levels" to varying amounts of radiation.

Prepared by the Histological Group of the Health Division at the University of Chicago, this book covers a wide variety of experiments and gives detailed information relative to techniques and materials.

A great and varied assortment of radioactive agents were employed in these experiments, including beta and gamma rays; fast and slow neutrons; and X-rays to establish a base line for comparison. The effects of sodium 24, carbon 14, yttrium 91, radium and many others were also studied. The radioactive isotopes were administered intramuscularly, intravenously, intracardially, or intraperitoneally. In addition a few series of animals were given radioactive substances by inhalation or gavage.

This volume describes the histopathological and cytological effect of radioactive agents in the cells, skin, bone, bone marrow, spleen, lymph node and intestinal lymphatic tissue, the thymus, gastrointestinal tract, structures accessory to the gastrointestinal tract, testis, ovary, kidney, lung, vascular system, adrenal, nervous system, etc.

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THE PHARMACOLOGY AND TOXICOLOGY OF URANIUM COMPOUNDS

EDITORS
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This volume summarizes years of research and many experiments on the toxicity of uranium compounds and the mechanism of uranium poisoning.

A number of uranium compounds employed in the production of atomic energy are measured for toxic qualities. These experiments were made preceding various conditions, including: exposure by inhalation of dust or fumes; by skin and eye application; and by oral and parenteral administration. Large scale acute tests of the degree of air contamination by uranium compounds form a major part of the overall program. The problems of aerosol production, control, and measurement are described; details are given on such aspects as the relationship of particle size to toxicity and the adaptation of the cascade impactor for routine dust measurements.

Emphasis is placed on the mechanism of action of uranium. The physico-chemical rules which govern the formation of uranium-protein complexes and bicarbonate complexes are applied to the transport of uranium in the body and to its excretion through the kidney. The characteristic uranium in the kidney is described both from histopathological studies and from function studies. The role of citrate in tolerance is also covered. Many of the methods and techniques of investigation are given in detail, such as the measurement of catalase in urine and the standardization of toxicological procedures for large scale investigation. New uranium methods contained in this volume are: Skin and eye toxicity; the analytical method; inhalation toxicity; distribution and excretion; theory tolerance; enzyme and protein effects and the catalase method.

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PREVIEWS OF ARMAGEDDON

Two high-ranking American air generals have given the public previews of a war with the Soviet Union. General George C. Kenney, commander of the Strategic Air Command, did this in a lecture before the Maine State Federation of Women's Clubs, reported in "Newsweek" on May 17; General Carl Spaatz, the retired Chief of Staff of the U. S. Air Force, in a featured article in "Life" on July 5. Articles similar in content, but more elaborate in technical detail, have appeared in several military journals.

Assuming that America may be soon attacked or forced into war by aggressive Soviet policy, the authors of these articles discuss in a matter-of-fact way, what they think American plans for fighting such a war are (or should be), placing heavy emphasis on aerial atomic bomb attacks on Soviet cities and industrial centers.

The staff of any great military power would be derelict in its duties if it left unprepared up-to-date campaign plans for fighting any likely or unlikely enemy nation, or if in planning it, failed to consider any weapons, the use of which might conceivably prove advantageous in such a conflict. No American law prevents anybody, generals not excluded, from talking or writing about such plans. And yet, there is something wrong, politically and morally, with our generals making use of this right and with reputable mass circulation magazines prominently displaying their stories.

Such stories cannot be justified as "reports to the people on things the people are entitled to know." As long as war exists, military secrecy will exist; and plans of future campaigns will properly be among the most closely guarded of these secrets. Public discussion of such plans, particularly if it bears the stamp of authenticity, must therefore appear to all—and not only to the Soviet rulers—as a deliberate step in the "war of nerves."

OUR FRIENDS IN EUROPE MUST BE SHOCKED

As a move in the war of nerves, the discussion of massive atomic bomb attacks on Russian cities and industrial centers, presumably is directed at the Soviet rulers. However, it is unlikely that these rulers need magazine articles to convince them that the American military leadership will not hesitate to use the atomic bomb to the utmost of its potentialities in a war against the Soviet Union. It is also unlikely that they cherish the hope that American political leadership will refuse the military a free hand in such a contingency. The actual propaganda objects of these articles, are therefore not the rulers, but the peoples of the world, including the American people, and it is doubtful that the effect is to promote the cause of America.

At present our strongest propaganda weapon is provided by the European Recovery Program, in which America appears as leader in the peaceful reconstruction of the world. All deeds or words that make us appear to be, if not looking forward to a military "showdown" with eagerness, at least contemplating it with a certain equanimity, strengthens the lingering doubts in the minds of our friends as to whether America really cares for Europe, or regards it merely as an "expendable" bridgehead in an intercontinental war.

The expectation of first being abandoned to Soviet occupation and exploitation and then exposed to American aerial destruction, is not likely to strengthen the European will to work for political and economic reconstruction—the will on which the success of the Marshall Plan is predicated.

RUSSIANS FORCED TO RALLY TO THEIR LEADERS; BRUTALIZATION OF AMERICAN MIND

If the Soviet regime is tyrannical and brutal (as a majority of Americans now believe), the longest-suffering victims of this tyranny are the peoples of Russia. In whatever way we oppose their political system, we need as much of their friendship as can be acquired through the barriers erected by their rulers. But while political leaders speak of a fight against an evil political system, our military experts can offer only an "old-fashioned" war against a nation, although under the present conditions, it really means decimation of a whole people, perhaps of a whole continent.

The first atomic bomb dropped on Moscow will create a hatred of America which will not be extinguished in generations. "Previews" of this event in American magazines can be only welcome to the Soviet propagandists and make it easier for them to fan the previously non-existent anti-American feelings in the Russian people.

Even more tragic can be the impact of such articles on the American mind. We often hear complaints of the brutalizing effect on American youth of the elaborate torture and murder stories in the so-called "comic" magazines. We do not suggest that the matter-of-fact discussions of a program of atomic bomb attacks on Russian cities arise from a deliberate desire of the military to "condition" American public opinion to the indiscriminate killing and maiming of millions of civilians; but is not their actual effect to soothe in advance all moral revulsion, and to make American people accept the possibility of atomic slaughter as something, perhaps deplorable, but natural in this imperfect world?

When the full implications of the release of atomic energy began to be widely realized, popular imagination was stirred, and the belief spread that the time has come to make a clean break with the past in the relations between nations. Since the first attempts to bring about such a change have failed—in part, at least because they have not been undertaken with enough imagination, and with the resolute will to succeed—many voices are now busy soothing the doubts and fears, and quieting uneasy consciences. People are told openly or by implication that they have been unnecessarily ruffled, that the atomic bomb did not change the world, that it can and must be fitted nicely into the old scheme of things.

Our generation has seen a rapid deterioration of standards which it took centuries to establish. We have seen the return of slavery, torture, killing of hostages. To these resurrected ancient cruelties, we have added new

ones, made possible by modern mass technology—human extermination camps, forced shifts of millions, mass bombing of cities.

True, it was the countries ruled by militarists, such as Germany in World War I, or, more recently, totalitarian dictatorships, nationalist or communist, who have initiated these cruelties; but in many instances, opposing democracies, after a brief period of indignation, took over, and even improved, the new methods of crushing military resistance and keeping down unruly populations.

In economics, there is a rule that "bad money" always displaces "good money" from circulation. Is there a similar law that lower standards must displace higher ones in warfare (and also in preparation for war, as witnessed by the present spread of intolerance in American political life)?

In the first World War, American public opinion was shocked by the sinking of passenger-carrying ships by German submarines, in the second World War, American submarines sank all Japanese ships on sight, and even the revelation that one of these ships was carrying American prisoners of war, has brought no belated wave of indignation at home. The Germans began the terror bombing of cities. The American propaganda long stuck to the pretense that we bombed only "military objectives" (with "pin-point accuracy"). Probably, this was done out of consideration for public opinion; but this concern proved to be excessive. Public opinion in America as well as elsewhere has long since accepted terror bombing of whole cities as a legitimate means of warfare. So conditioned, it was able to "take" the news of the destruction of Hiroshima and Nagasaki almost without qualms. Is it not legitimate to predict that if another war comes, no public indignation will meet an announcement of a successful use of psitaccosis virus, or of the wiping-out of enemy crops by chemicals, or poisoning of drinking water in the enemy's capital by radioactive poisons?

In mass fire and bomb raids on German and Japanese cities, America has won the leadership in this form of terror warfare; in the atomic bombardment of Hiroshima (arranged so as to inflict the maximum number of civilian casualties), we have compounded the terror of aerial war a thousandfold. In pre-viewing mass atomic attacks on Russian cities, are our aerial strategists asking the American people to acquiesce in advance to the final conversion of war into genocide?

The planners of a war against Russia cannot be blamed if they have really produced blueprints similar to those described by Kenney and Spaatz; these may be the only plans the military can evolve under the present conditions. These conditions could be changed by re-creation of a powerful Western European military force; but in all probability, not before the Soviet Union acquires atomic bombs, and thus makes Western Europe untenable even if a conventional army is on hand to defend it.

The fault is not with the military planners. The fault is with the bankruptcy of war as "a method of politics," as *ultima ratio regis*. As long as sovereign nations will consider wars as possible contingencies, the military will have to prepare their plans to make their nations victorious, regardless of material costs and moral consequences. It is from our political, not our military planners, that we could expect recognition of the madness of this conventional military thinking; but when the major political party which expects to come into power this year, forgets even to mention the words "atomic bomb" or "atomic energy" in its platform (while the minor party which aspires to leadership in the struggle for peace, is satisfied with a meaningless party-line platitude calling for "dismantling of atomic bombs"), the hope for new leadership from professional politicians appears dim indeed.

Our hope must rest with the peoples. The American people must not permit themselves the smug satisfaction that all they have to do is to remain "tough," since if need be, they can win another war, by slaughtering—by remote control, as it were—millions of Russian civilians. By holding out the hope that destruction of industrial centers of Russia will lead to collapse of the Soviet will to fight, and end the war without heavy losses in land fighting, and before the Russians would get a chance to retaliate on American cities, our aerial strategists appeal, —we are sure, without intent—to that great pacifier of uneasy consciences—the hope for immunity. The American conscience must refuse to be pacified. Instead, we hope that reading the articles of Kenney and Spaatz, the Americans will awaken to the realization that if no way is found to organize the world for peace, they, the American people, will become co-responsible for the most gigantic and indiscriminate mass murder in history, and thus, even while preserving their bodies, might lose their souls. Perhaps, the realization of this danger to their consciences will make many Americans ready to contemplate greater efforts and assume greater sacrifices for peace, than could be induced by appeals to their self-interest, or to their generosity.

It is not meant that we should retreat and sacrifice more nations to the totalitarian rule. We cannot save our souls by refusing to stand by our friends and our principles. But whenever it comes to sacrifices of our wealth or pride or sovereignty; whenever it is questioned whether we can afford new contributions for relief or rehabilitation, or whether the recipients—be they our former enimes or recent allies—really deserve this assistance; whenever it is suggested that we should refuse further negotiations because of repeated frustration or open insults—in all these situations, let us remember that the alternative to peace is not, or not merely to sacrifice the lives and possessions of Americans. The alternativ is to force Americans to commit, in the name of self-preservation, deeds of surpassing brutality.

Since the editorial in this issue was written, a second article by General Spaatz has appeared in "Life", on August 16. Following are its final paragraphs:

"To the present postwas crisis we Americans, with our unmatched air power and our policy of unconditional surrender, have been heavy, if unwitting, contributors. In Germany we ruined an industrial and commercial complex that must be rebuilt if Europe is ever to stand on its own feet again. In Japan we persisted in carrying the war to the home cities of an already beaten enemy. Yet powerful groups in both countries had long before the end recognized that their war was lost. Had we been able to solve this basic human problem, which lay in the realm of politics, the war might have been brought to a satisfactory end before both countries had been hammered to almost irretrievable ruin.

"This human, political problem is still with us. We can

look to military measures for our security in Phase I, and probably in Phase II. Assuming that we keep our present lead in technical skill and in industrial equipment, we may expect with some assurance that even a Phase III war would find us the "victor." But what sort of victory would it be, and what would be its rewards, if it required the destruction of half the world?

"Clemenceau once said that the conduct of war is too serious to be entrusted to generals. The airman at this stage might ask: Are wars not also too serious for politicians? Knowing the unlimited destructive power of a modern industrial state, we must think of our military might as a necessary but no more than temporary prop to our civilization.

"When the statesmen of the world have perfected some political formula for replacing war between nations, we will no longer have to maintain the most powerful air force in the world. And unless the good society is able to produce such a political formula an atomic war may end in the most tragic of paradoxes: the good society, in attempting to destroy evil, may destroy itself."

We said before that we have no quarrel with the military experts for preparing blueprints for atomic warfare. We now see that one of them, at least, has no quarrels with us, as far as the belief in the insanity of war and the necessity of a new pattern of world relations are concerned. Nevertheless, we are worried by callous public discussion of plans for atomic warfare. When scientists cry out for a reorganization of the world because new science and technology have made the old system inadequate, they are told to stick to the explanation of scientific and technological facts, and leave politics to those who understand it. We are worried that General Spaatz's advice of how best to prepare to fight and win the next atomic war, will be listened to as the opinions of a distinguished specialist, but his eloquent appeal for making this war impossible by political means, will be dismissed as another case of an expert talking lightly about things, the difficulties of which he does not understand.

—E. R.

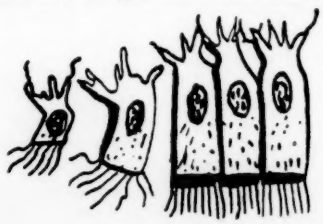
MILITARY VS. CIVILIAN CONTROL OF BOMB DEBATED IN SECRET

The following statement was released on the third anniversary of the destruction of Hiroshima by William A. Higginbotham, Vice-Chairman of the Federation of American Scientists. For material relevant to this statement the reader is referred to the following articles printed elsewhere in this issue: President Truman's statement on the fourth Semi-annual report of the AEC and the Report itself; "New Legislation to Replace the McMahon Act" by Walter DeCew; "Shall the Atomic Energy Act be Revised?" by Edward Levi; "The Atomic Energy Act: Public Administration without Public Debate" by Herbert Marks.

Military versus civilian custody of atomic bombs is being debated in secret, without the knowledge or advice of the American people. The cloak of secrecy is maintained, not for security reasons, but as a matter of convenience, and the general public has had to content itself thus far with the unsubstantiated accounts of a few reporters. It appears that the government is not taking the public into its confidence in a matter of greatest importance to their welfare.

The situation, so far as we have been able to determine, is as follows. The issue is the desire of the military for physical custody of the U.S. stockpile of atomic bombs. At present, presumably, all bombs are stored and guarded by the civilian Atomic Energy Commission. But the Atomic Energy Act of 1946 specifies that the President may order atomic bombs transferred to the armed forces "in the interest of national defense." Under the present arrangement, the armed forces are allowed to carry out any tests or routines necessary to their understanding and preparation for use of the atomic bomb as a weapon. Authorized members of the armed services worked closely with the civilian scientists during the recent test of atomic weapons at Eniwetok.

But some military leaders want more than this. They use the deceptively plausible argument that since atomic bombs are military weapons, they should be entirely in charge of the military. Technically, this would mean only that the military instead of civilians would store, maintain, and guard bombs and bomb components. Actually, it would be physically possible for military men to make the decision to use the atomic bomb and carry this decision into effect. A "border incident" involving the use of an atomic bomb could not easily be smoothed by diplomacy.



The single bomb that destroyed the Japanese city of Hiroshima three years ago was more than just another weapon. The rest of the world realizes this so well that the very location of one or more atomic bombs could be made a potent instrument of foreign policy. We feel that this instrument should be retained firmly in the hands of the President and his advisers who have an overall picture of the international political situation; we feel that it should not be put in the hands of men who are likely to consider only military advantage. The Federation has frequently pointed out the danger of confusing national security with military security.

As things stand now, the President must approve each use of the bomb and direct the Atomic Energy Commission to turn them over to the military at the proper time. This procedure insures that any decision relating to the bomb is made by the top-ranking civilian authority of the country and makes impossible any accidental misuse of responsibility by subordinate military authority.

The national security is certainly not endangered by making public the pros and cons of this issue, whether the bomb should be held by civilians or soldiers. This is just another aspect of the general issue of civilian versus military control which was debated with the fullest publicity in 1945 and 1946 preceding the passage of the McMahon Act. If the armed forces have any criticism of the present procedures, if they feel, as some of them have implied, that they are hampered by "red tape", these criticisms, together with the questioned procedures, should be made public. The Federation of American Scientists believes that these vital issues should be discussed openly by a wide cross-section of the American public.

POLICY AT THE CROSSROADS

George C. Marshall

The following is the foreward to "International Control of Atomic Energy: Policy at the Crossroads,"* a summary record of United States policy developments concerning international control, published by the Department of State and reprinted here with their kind permission.

The United Nations Atomic Energy Commission reported on May 17, 1948, that it had reached an impasse in its work and that no useful purpose could be served by carrying on further negotiations at the Commission's level.

This Government has striven for two and one-half years to achieve international control of atomic energy. In this endeavor it has met with gratifying cooperation on the part of most of the members of the Commission. On the basis of the proposals originally made by the United States, 14 out of 17 of the nations which are now, or have been, represented on the Commission have worked out together what they consider to be the essential basis for the establishment of an effective system of control. The Soviet Union, Poland, and the Ukraine still reject the majority proposals. With the Third Report of the United Nations Atomic Energy Commission the majority, including the United States, concludes that further efforts to achieve international control at this time should be carried out at a higher level in the United Nations.

The Department of State, in keeping with the objective that a democratic foreign policy should rely on an informed citizenry, presents in this volume the record of United States participation in the United Nations Atomic Energy Commission since October 1946. Together with the previous volume, entitled *Growth of a Policy*, it constitutes a full record of this Government's efforts in this field since the advent of atomic energy.

After the disclosure to the world on August 6, 1945, of the development of atomic energy, the United States moved to establish international machinery to insure that atomic energy would be used only for peaceful purposes. President Truman met in Washington with the Prime Ministers of the United Kingdom and Canada in November 1945 for conversations which resulted in an agreed declaration calling for international action under the auspices of the United Nations. The Secretary of State of the United States and the Foreign Ministers of the United Kingdom and the Soviet Union then met at Moscow in December 1945, and the Soviet Union agreed to sponsor, along with Canada, China, France, the United Kingdom, and the United States, a resolution establishing the United Nations Atomic Energy Commission. This was approved by the General Assembly in its First Session in London in January 1946 without a dissenting vote.

At the opening session of the United Nations Atomic Energy Commission in June 1946 the United States made specific proposals for the international control of atomic energy.

Provided that an adequate system for international control of atomic energy were put into effect, the United States offered to dispose of its atomic bombs, to give up all its activities in the production of dangerous quantities of atomic materials, and to turn over its knowledge of these processes to an international agency.

The United States proposed that the international agency should have broad powers including:

1. Managerial control or ownership of all atomic-energy activities potentially dangerous to world security.
2. Power to control, inspect, and license all other atomic activities.
3. The duty of fostering the beneficial uses of atomic energy.
4. Research and development responsibilities of an affirmative character intended to put the Authority in the forefront of atomic knowledge and thus to enable it to comprehend, and therefore to detect, misuse of atomic energy.

The Soviet Union rejected the United States proposals for control as being unacceptable either "as a whole or in their separate parts." This rejection has been frequently reiterated with increasing firmness and clarity.

The Soviet Union, on the other hand, presented proposals of its own in June 1946 and in June 1947. These were carefully reviewed by the other representatives, especially in the light of a questionnaire presented to the Soviet Union Representative by the United Kingdom.

In a formal resolution of April 5, 1948, the majority held that the Soviet proposals: ". . . ignore the existing technical knowledge of the problem of atomic energy control, do not provide an adequate basis for the effective international control of atomic energy and the elimination from national armaments of atomic weapons, and therefore, do not conform to the terms of reference of the Atomic Energy Commission."

Many issues divide the majority from the minority. These are reviewed in section 11 of this report. There follows a brief summary of the most important:

1. The majority believes, and the United States agrees, that the international agreement setting up the control system should make provision for the prohibition and elimination of atomic weapons from national armaments. The Soviet Union on the other hand continues to insist that a convention prohibiting atomic weapons should be signed, ratified, and put into effect and the weapons destroyed, before consideration is given to any system of control. Even if the Soviet convention on prohibition were agreed upon, the Soviet Union will give no assurances that a second convention on control would be acceptable.

2. The Soviet Union rejects as an unwarranted intrusion on national sovereignty a control agency with those powers of ownership, operation, management, and adequate inspection which the majority, including the United States, considers essential to real control. Unless the international

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* Department of State Publication 3161, released June, 1948. Available from U. S. Government Printing Office, Washington 25, D. C. Price 45 cents. Addenda include the most important working documents of the UN AEC.

agency has such affirmative powers, duly prescribed and defined by treaty, nationalistic rivalries would still operate and might lead to conflict behind a screen of false assurance. A sham control is worse than none.

The existence of a strong control agency, to which each nation would yield some sovereignty in the field of atomic energy, would, in itself, reduce the problem of inspection to manageable proportions. The Soviet Union, however, considers that inspection should be of a limited periodic character and primarily apply only to these atomic facilities reported by states.

Nuclear fuel has a dual nature. The processes for production of atomic weapons and for development of atomic energy for peaceful purposes are, through most of their courses, identical and inseparable. Under a control plan which left individual nations free to do as they pleased with the atom, inspectors would have to look not only into the operations of the plant but also into the motives of the operators.

The differences in the kinds of inspectorates proposed by the majority and minority arise from their different way of looking at the kind of control authority which ought to be set up, which in turn seems to spring from a different conception of national obligations in an atomic world society.

Despite unceasing efforts, the majority of the Commission has been compelled to declare that it "has been unable to secure the agreement of the USSR to even those elements of effective control considered essential from the technical point of view, let alone its acceptance of the nature and extent of participation in the world community required of all nations in this field by the First and Second Reports of the Atomic Energy Commission."

In this situation, the Commission concludes that no useful purpose can be served by carrying on negotiations at the Commission level. The United States supports this conclusion.

The Commission has recommended to the Security Council that the matter be referred to the next regular session of the General Assembly as a matter of special concern. The United Nations is still confronted with the issue.

The international control of atomic energy remains a paramount problem of humanity.

The United States will continue in its efforts to reach a solution of that problem.

OUR INTERNATIONAL CONTROL PLAN NOT SUFFICIENTLY KNOWN TO THE WORLD

—BRIEN McMAHON—

The only speech at the Philadelphia conventions of the three political parties devoted to atomic energy was given on July 13 by Senator Brien McMahon (Conn.) at the Democratic convention. We print here the salient parts of the speech.

We talk much of moral and spiritual leadership—and most of the people who use the phrase could not, if their lives depended on it, translate the phrases into ideas either understandable or sensible to the working men and women of the earth. But if we shall point out, with all the resources at our command, that we have tried to bring peace to their minds and joy to their hearts, we will, as sure as the sun shall rise, gather unto ourselves the support of the peoples of the earth.

We have written a page in the book of man's progress through this vale of blood and conflict, that has shined as a beacon to all governments except one—but has singularly left untouched the common peoples of the earth.

The American proposal for the control of atomic energy was made in the spirit of peace. It was made in the spirit of good will. This proposal was just, it was generous, and it was unique in the history of international relations. Never before had a great nation voluntarily offered to give up a winning weapon which it alone possessed, for the sole purpose of promoting the cause of peace and international understanding.

It is heartening to know that ten great nations, represented on the United Nations Commission, accepted the American plan whole-heartedly in the spirit in which it was offered—as a sincere and effective proposal to advance the cause of human progress.

It is disheartening to know that the intransigence of one nation, and one nation only, Soviet Russia, prevented the adoption of this atomic control plan as the first and basic step in a program of universal disarmament.

Soviet obstinacy on the issue of atomic control was a tragedy for all the race of mankind. This plan could have been, and *should still be*, the pilot *plan* of effective cooperation between nations in the sacred cause of peace.

Hardly less disturbing than Russia's refusal to cooperate is the failure of our own American people to realize what the American proposal means in terms of world disarmament and permanent peace. The unhappy truth is that we have failed to inform ourselves of the tremendous stakes bound up in this issue. We have failed to appreciate that the safety of the United States, and the safety of civilization, is in peril until agreement is reached for the elimination of atomic weapons as instruments of warfare.

Only three short weeks ago, the Republican Party adopted a platform which pledged all-out effort in the cause of peace and yet failed to make a single reference to the problems raised by atomic energy. Worse still, the Republican Platform builders actually rejected a plank which favored effective international control of atomic energy.

How can the United States lead the way to universal disarmament and permanent peace if our own leaders look upon atomic warfare as inevitable? How can we possibly avoid such a conflict, with all its horrors and terrors, unless we continue with all our force and vigor the great struggle for the adoption of effective international control?

The first and greatest contribution which we can make is to acquaint the people of the United States with the details of the atomic control plan which this nation proposed as the first step in a program of universal disarmament.

Under that program the United States offered to disclose its atomic secrets.

The United States offered to rid itself of all atomic weapons.

The United States offered to place all its atomic plants and factories under international control.

Finally, the United States offered to admit international inspectors into its borders so that the whole world could be certain of American integrity.

In return the United States asked one condition only: that other nations accept the same controls imposed on us.

This offer was the most generous in the history of nations and its acceptance is still the acid test of good faith on the part of any country which professes to seek universal peace.

(Continued on page 288)

THE RADIOCARBON STORY

W. F. Libby

Abundant radiocarbon is one of the most important contributions to date of the atomic pile towards the progress of mankind. In the following review, Dr. Libby, one of the pioneers in the field of tracer research, reviews some of the principles of the application of radiocarbon, such as synthesis of organic compounds with radiocarbon in a definite place in the molecule and biosynthesis ("isotope farming"). Dr. Libby is Professor of Chemistry and a members of the Institute for Nuclear Studies at the University of Chicago.

Of all the chemical elements occurring in nature carbon is unique; it may well be claimed that living processes are built around this element as a center. The molecules which characterize living systems contain carbon in their skeletal structure. One can imagine the more complicated molecules such as proteins to be not unlike animal bodies, possessing certain mutable structures, which we may think of as the skeleton, upon which is mounted and appended the more labile materials analogous to the flesh.

It is quite clear from this analogy that the characterizing features of large molecules most likely will be associated with the skeletal structure, which is more difficult to alter. The atoms other than carbon occurring in living systems seem to play their greatest role in the molecular "flesh" described above.

The extraordinary ability of proteins, for example, to retain individual characteristics probably is associated with the skeletal system of the molecule, and this in turn must be connected with the carbon linkages and to a lesser extent, the nitrogen and oxygen linkages in the molecule. The explanation of the appearance in large molecules of the ability to reproduce, and the other distinguishing features of living systems, has not been given in terms of the properties of the constituent atoms in the system. That is, there seem to be properties of large molecular aggregates which are not present even in kind in simple systems.

In molecules which contain at most one or two atoms of any given element, even though several elements may be represented, the differences in chemical properties of the elements may provide a relatively direct and simple method of attack on molecular structure and properties. It may well be said that this phase of chemistry is reaching a state of maturity and that we are able at the present time to do a rather expert job of predicting the properties of a given molecular structure of this sort, or of analyzing the behavior of such molecules.

These molecules do not play a serious role, however, in biochemical systems. On the other hand, the life processes are concerned with large molecules consisting of a relatively small number of elements, and the problem of experimentally characterizing the different parts of these molecules seemed almost insuperable until the possibility of isotopic tracers for carbon, nitrogen, oxygen, hydrogen and the other biological elements appeared. The isotopic tracer method consists in the use of two atoms of nearly identical chemical properties but widely differing nuclear properties.

The term nuclear properties may need slight explanation. The atom consists of a tiny heavy central body called the atomic nucleus, around which a crowd of electrons somewhat analogous to the planets in the solar system rotate. All of the chemical properties in an atom are associated with these planetary electrons, so the term nuclear property refers to the properties of the internal nuclear body, which of necessity are non-chemical since the nucleus is so well shielded by the outside electrons. Two such nuclear properties are the mass of the atom and radioactivity.

The phenomenon of isotopy was discovered in England early in the present century by Soddy among the heavier radioactive elements. The great modern development began in 1932 with Urey's discovery of an isotope of hydrogen, deuterium. Following this was the discovery of artificial radioactivity by Joliet and Curie in 1934. It has been discovered since that nearly every element possesses isotopic tracers of one sort or another.

This broadening of Soddy's discovery is of course of the greatest importance to biology, because the biological elements lie in the light end of the periodic table far from the heavy elements in which he worked. The hydrogen isotope deuterium has been most useful in the elucidation of biological processes. It, however, is primarily a constituent of what we call the "molecular flesh", and the attack on the real central carbon element was delayed a few years until Urey separated the carbon 13 isotope which occurs in all natural carbon to the extent of about 1%.

This made possible for the first time isotopic carbon tracer work. This is a most valuable technique and has a very wide range of application to biological systems. However, it has an essential weakness in the fact that carbon 13 is present to about 1% in all normal carbon. It is therefore extremely difficult to dilute a carbon 13 marked biochemical more than about 10 thousand fold.

Actually, in many biological systems larger dilution factors are necessary, so a part of the carbon tracer problem remained unsolved until the discovery of carbon 14 (hereafter called radiocarbon), by Ruben and Kamen in 1940. This isotope is distinguished from the normal carbon atoms in two ways—by its radioactivity and by its mass. Its radioactivity, however, is a much handier tool for measuring it than its mass, though experiments have been done in which its mass has been used. One gram of pure carbon 14 can be diluted to the extent of 1 million million fold before it in turn becomes too difficult to detect.

In addition, the advent of the chain reacting pile has made its production in enormous quantities a routine and economical process, so that at the present time the problems which might normally have been solved with carbon 13 are frequently being attacked by this isotope for reasons of economy. Two hundred micrograms of the isotope is sold for $50.00 by the Atomic Energy Commission. This is a quantity entirely sufficient for many research problems. Occasional requests up to 2 to 3 milligrams have been made, but the extreme intensity of the radioactive radiation makes it possible to detect very small fractions of a gram with great ease.

The problems occurring in living systems, consisting as they do of extremely individualistic and structurally complicated organic molecules, appear to afford the greatest opportunities for isotopic tracers.

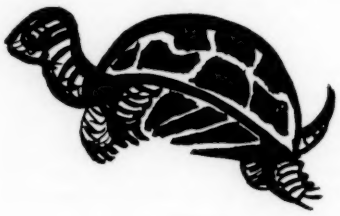
There are two broad general methods of attack on these biochemical problems, the first consisting of placing a tracer carbon atom in a definite, known position in a molecule, feeding or injecting this material into the animal body, and analyzing the animal both anatomically and chemically for the disposition of the marked material.

This type of research has revealed that biological systems are in a constant state of interchange with the external world, and that the atoms present at any given instant in a living body probably will be replaced within a few weeks or months.

The rates of replacement vary considerably with the nature of the tissue, fluid, or bone structure, but it seems clear that with very few exceptions indeed, the atoms in an individual at any given time are not those which were present a few months or at most a few years before. This was not an unexpected result, but the tracer technique was indispensable in proving it.

Another valuable result of this type of research has been information on the rates of distribution of various substances among the different organs of the body, i.e., the anatomical problem. Again, the results have been not unexpected. The teeth, bones, and brain tissues in general have the lowest rates of assimilation, whereas the internal organs and the blood have the highest.

Connected with this problem is the problem of the rate of dissimilation or sloughing off of materials, and as one might expect the general result is that those organs having the highest rates of assimilation have the highest rates of dissimilation. For example, one of the more worrisome characteristics of radiocarbon is that when assimilated as carbonate or in a form readily convertible into carbonate, the bone calcium carbonate seems to become active, particularly in the case of growing animals, and to retain its activity for considerable periods, though the level of activity at any given time may be considerably below the peak activity obtained in an internal organ such as the liver. The liver's activity rises rapidly after feeding with these substances, but also proceeds to fall in a few days nearly to zero.



Despite the obvious interest of the turnover and anatomical distribution problems, probably the most fundamentally important information obtained is a detailed description of the biochemical mechanisms involved in metabolism. For example, it has been known for many years that the body is capable of disintegrating many foods into simpler substances, and synthesizing new and more acceptable molecules with a considerable efficiency. However, this type of process may occur even in cases undiscovered before for reasons of the inadequacies of the methods of analysis. The first results with the tracer technique seem to indicate that this may be true. The molecules which we were inclined to believe were assimilated by the body as a unit are themselves subject to these working over processes. This sort of change can be investigated very nicely by placing the radiocarbon in each of the various available positions in a given molecule to be fed, and conducting a series of experiments, one for each of the various positions, and observing the resulting anatomical and chemical distributions.

Probably a word should be said about the chemical problems associated with this method. In the first instance one must incorporate the isotopic material in the molecule in a known position. This requires synthesis of the molecule in such a way that the location of the isotopic carbon will be known and certain. It furthermore requires that after the feeding and sampling of the animal has taken place the product materials must be degraded piece by piece in order that the exact location of the isotopic carbon in the product be determined. Both of these steps, the synthesis and analysis, require the highest organic chemical skills, and it is unfortunately true that in a great fraction of the problems involved these tasks seem to be too difficult of performance at present.

The second general method of employing isotopic tracers in biology circumvents these difficulties of synthesis and analysis to a certain extent simply by foregoing much of the insight which could be attained by the first method, and employing simpler synthetic procedures. This is the method of biosynthesis or "isotope farming".

The procedures are rather obvious. Plants are grown in radioactive carbon dioxide and animals are fed on these plants. The excretion products of the animals can be used to fertilize the plants, and under proper conditions an economy of radiocarbon obtained with a maximum efficiency of incorporation in biochemicals obtained.

This type of procedure is an old one and has been used since the first application of the tracer method to biology, but the increase in availability of carbon tracers brought about by the application of the atomic piles to the production of radiocarbon makes possible a great acceleration and expansion in this biosynthetic carbon isotope farming method.

One envisages the possibility of producing in labeled form by this method most of the drugs and biochemicals now available. The Atomic Energy Commission is undertaking such a program at the present time on a modest scale at the Argonne National Laboratory. It is hoped that one or two other sites may be involved in the future.

As mentioned earlier, this is a method of indiscriminate location of

the marked carbon atoms throughout the organic molecule. Since the plants and animals may in general be grown from infancy, one is relatively certain of a homogeneous distribution of the radiocarbon throughout the organic molecules.

So, the only information available about the isotopic composition of the feed material is that all of the carbon atoms are equally likely to be marked and that the mean composition has a certain value measured by the specific radioactivity of the material.

This of course makes the method considerably less powerful in principle than the first one where exact placement is accomplished, but it also allows all of the biochemicals to be investigated. For example, it is difficult to imagine any chemical synthesis of a molecule such as insulin in the immediately foreseeable future, yet the problem of the metabolism of insulin appears to be a serious and important task facing the biochemist at the present time.

Other materials in this class are digitalis (though there appears to be some possibility of its synthetic preparation), the various other high potency drugs, and the general class of "miracle drugs" such as penicillin, streptomycin, etc. It is probable that in the case of the sulfanilamides direct synthetic methods will be applicable, as may eventually prove to be the case with some of the other members of this class.

In addition to these highly potent materials, we have hundreds of substances normally assimilated by the body whose availability in marked form should be of the greatest value, both in research and possibly in clinical medical practice.

It seems not unlikely, for example, that diagnostic techniques may be made possible by the use of these readily available marked biochemicals, the point being that the additional analytical information furnished by the radioactivity of the constituent atoms may make possible a more complete insight into the metabolic processes and help in the revelation of pathological conditions.

One can imagine, for example, that one of the relatively simple materials might be fed to an animal, and the rates of excretion of the radioactive materials in the breath, urine, and feces measured, and these data, taken together with the ordinary chemical analyses, used to test for deviations from normal behavior. Of course this sort of diagnostic application will wait on extensive research, but the possibility seems most exciting.

In pure research on the basic problems of metabolism both from the anatomical and chemical points of view, it seems likely that these indiscriminately labeled products of the isotope farm will be of great value.

In the case of the high potency materials, just the anatomical picture may be most revealing, that is, the observation of the exact distribution in the human body as a function of time after the injection of the materials (very small amounts of which normally are found to be adequate).

In the case of the other biochemicals, many applications are likely to be fruitful. A typical one which has been called to mind by Dr. Lewis Friedman of our Laboratories is the possibility of increasing the accuracy of the analysis of proteins for the constituent amino acids by growing radioactive proteins on the farms, hydrolyzing them, and separating into pure amino acid fractions, and adding known amounts of these pure fractions to the hydrolyzed mixture of the protein subject to analysis, separating pure salts of each of the constituent amino acids, and observing by the decrease in specific radioactivity the amount of amino acid that must have been present in the unknown protein.

This type of application of the well known isotopic dilution technique illustrates some of the possibilities of having radioactive drugs and biochemicals readily available.

It is of course clear that a combination of the placement synthesis methods and the biosynthetic carbon farming methods may in many instances be profitable, and that these methods are not in any way restricted to isotopic carbon, but should well include in the foreseeable future isotopic hydrogen either as deuterium or the radioactive isotope tritium, and possibly isotopic nitrogen marked by the nitrogen 15 isotope.

As has so often been true in cases of new developments in medicine, there are some doubts that radiocarbon is an unmixed blessing. At the present time the cautionary limit of some 6 micrograms (30 microcuries) per human being has been set, this 6 micrograms to be present in the body in an assimilated form over a considerable period of time. The medical authorities issuing this caution are the first to say that their sources of information are inadequate and that this may indeed be an overcautious statement. There is little doubt, however, that an animal all of whose atoms consisted of carbon 14 could not live.

In addition to the serious damage due to the radiation emitted as estimated from x-ray experience, there probably is an additional damage due to the transmutation of the carbon atom into nitrogen. Since the skeletal and individuality-determining atoms in the protein molecules, which must be the central sites and agents of the living processes, are carbon, and since the very immutability of the skeletal structure, that is, the permanency of the carbon-carbon linkage, probably means that a rupture of this structure will be difficult to repair, we may conclude that at least half of the carbon atoms and perhaps more are in such vital positions that their destruction and transformation into nitrogen atoms would mean the essential destruction of the particular protein molecule.

For simplicity we assume a protein molecule with one million carbon atoms present. If all of these are carbon 14 atoms and if the destruction of any one of these is sufficient, we may calculate the life expectancy of the molecule to be one millionth of the average life of the radiocarbon atom which is 7500 years (the half life is about 5100 years). This answer of 2.8 days is a little short, probably, since many of the proteins will have less than one million carbon atoms and since the position of perhaps more than half of the carbons may make their destruction less important.

Perhaps the highest radiocarbon content achieved to date in living systems is that attained recently at the Argonne National Laboratory on the isotope farm, where one of the green algae found in stagnant waters (Scenedesmus) has been cultured at a level of about 1 millicurie per gram of carbon. This corresponds to one of every 5000 carbon atoms being radiocarbon.

Remembering, however, that pure carbon 14 can be diluted one million million fold, one sees that even if we must obey present medical advice the use of radiocarbon in human medicine is by no means forbidden, and we have the right to speculate on the great possibilities opened in this field by this most important product of the atomic piles.

Radiocarbon occurs in nature too, and in fact the quantity naturally present in all probability dwarfs any amount that will ever be made by man. It occurs only in organic matter that has been recently alive, and is not found in long dead organic matter such as coal, oil, etc.

Its origin is the bombardment of the higher layers of the air by cosmic rays. Direct physical measurement has revealed the production in the atmosphere of about 2 neutrons per square centimeter of the earth's surface per second by the incoming cosmic rays.

Most of this production occurs at very high altitudes, so the chances of a neutron finding its way to sea level or being produced at sea level are very small.

If one irradiates air with fast neutrons in the laboratory, one of the principal products one finds, to better than about 99% yield, is radiocarbon. Therefore we are at liberty to expect that the cosmic rays produce 2 radiocarbon atoms per second per square centimeter of the earth's surface.

Since this process probably has been proceeding for a long time a condition most likely exists in which the rate of formation and destruction are equal. This enables us to estimate immediately the total inventory of radiocarbon on earth from this source.

A property of the radiocarbon atom is that it lives an average time of 7500 years, or that half of any given number of atoms will have disappeared in about 5100 years. In other words, a gram of pure carbon 14 will emit about 1.9×10^{11} beta particles per second, each beta particle being released as 1 carbon atom changes into a nitrogen atom.

In the condition of steady state postulated, we conclude that there must be 2 such beta particles per second per square centimeter of earth's surface. The area of the earth is about 5×10^{18} square centimeters, so we conclude that on the whole earth we must have 10^{19} radiocarbon beta particles per second. Dividing 10^{19} by 1.9×10^{11}, we calculate 5×10^{7} grams, or 50 metric tons, as the expected weight of radiocarbon on earth. This is some 250 billion millicuries, and at first sight would seem to be sufficient for tracer purposes. It is, however, so diluted by inert material that this use appears not to be important.

Remembering that the radiocarbon is generated in the higher layers of the atmosphere by action of the cosmic rays, it seems certain from a chemical point of view that the carbon will be very quickly converted to carbon dioxide by the oxygen of the air. Thereafter it will mix with the carbon dioxide in the air and be incorporated into the life cycle by the action of plants; that is, the plants will utilize it and the animals will eat the plants, exhaling carbon dioxide, which will mix with more radiocarbon, and the result expected is that all carbon in living material will be radioactive to an extent equal to the total inventory of radiocarbon on earth calculated above, divided by the sum of the total amounts of carbon in the air, in the sea, and in living systems on earth. The result is 1 gram of radiocarbon in 1 million million grams of ordinary carbon.

(The dissolved carbonate in the ocean must be included in the calculation, since it, too, rapidly exchanges carbon with atmospheric carbon dioxide.) Experimental test of these speculations was made by collecting methane gas produced in the sewage disposal plants in the city of Baltimore.

This gas was enriched by Dr. A. V. Grosse and his collaborators at the Houndry Process Corporation installation in Marcus Hook, Pennsylvania. Their plant, normally used for the production of carbon 13 from ordinary methane, enriched any radiocarbon present in this material by 250-fold. An enriched sample then was tested for radioactivity and found to be strongly active, with the active material having the chemical behavior of carbon and emitting radiations with the same absorption coefficient in aluminum as synthetic radiocarbon. The amount found in the Baltimore sewage was equal to that expected within a factor of 3. A similar experiment with methane from an oil well showed no radioactivity, establishing the absence of radiocarbon in long dead organic matter.

Since then, improvements in detecting procedures have made it possible to assay the natural radiocarbon without enrichment to about 10% accuracy. Samples from widely separated parts of the earth have been measured, and it appears that the distribution is moderately uniform despite the known fact that the cosmic ray intensity varies rather strongly with latitude, being less intense at the equator (these remarks hold for the neutron component only).

All living material has nearly 10 disintegrations per minute per gram of body carbon, due to the natural carbon content. If we can assume that this was true in the past, and that at death the interchange with the living world stopped, we may have a method for determining the time elapsed since death for a buried material.

Since the half life of radiocarbon is 5100 years, this method, coupled with an isotopic concentration device to make the measurement of the older samples easier, might be expected to allow dating in the range of 1,000 to 30,000 years. This attempt is being made, the first step being to prove the method by testing it against materials of known date obtained from Egypt.

Another result is that the method allows one to distinguish between materials derived from the living world and the dead organic world. For example, alcohol made from grain and alcohol made from coal can be readily distinguished by testing it for radioactivity. The measurement itself requires special apparatus, but is not extremely difficult to make. It is equivalent to measuring carbon 14 at the million million fold dilution mentioned earlier.

It is probable that radiocarbon and the radioactive isotope of hydrogen, tritium, of 11 year half life, are potentially the most valuable of the isotopes produced by the atomic reactors because of their great potential uses for medical and biological research, and that their application and the results derived therefrom will be among the most important peacetime uses of atomic energy.

Time and effort are necessary for the realization of these potentialities, but the existence of the possibilities having been established, we have good reason to hope for their attainment in the next few years.

PRESIDENT TRUMAN UPHOLDS THE ATOMIC ENERGY ACT

In transmitting to Congress the Fourth Semi-annual Report of the United States Atomic Energy Commission, President Truman made the following statement upholding the principles of civilian control and public ownership of atomic energy, as embodied in the presently operating Atomic Energy Act. This statement acquires considerable significance in the light of the agitation for amending the Act in the direction of weakening both civilian control and public ownership, as illustrated by the editorial reprinted in this issue of the BULLETIN from NUCLEONICS (McGraw-Hill, Publishers). Such careful observers as Hanson Baldwin in the NEW YORK TIMES were convinced of the accuracy of the unofficial reports that the Military Liaison Committee made a determined effort to wrest the custody of the atomic bomb from the civilian commission and transfer it to the military just prior to the release of the Commission's Fourth Report. According to these reports, the Military Liaison Committee was blocked by the President, to whom the McMahon bill had given the position of arbiter between the Commission and the military. On page 260 we print a statement on ths issue by the Vice-Chairman of the Federation of American Scientists. Portions of the report, to which President Truman's statement serves as an introduction, appear on pages 268-270.

Today the fourth semi-annual report of the Atomic Energy Commission is made public, almost on the eve of the second anniversary of the Atomic Energy Act of 1946. Every thoughtful person should become familiar with this report. Atomic energy is not only the Government's business; it is the vital concern of every citizen.

Two years have elapsed since the Atomic Energy Act became law, and it is now possible to see in true perspective the wisdom of that legislation. Rarely has the writing of a statute so challenged this nation's political courage and integrity. Never before has a nation victorious in war, and unequalled in power, demonstrated more concretely its devotion to peace and social progress.

The Atomic Energy Act stands upon four policy points. The first is that since a free society places the civil authority above the military power, the control of atomic energy properly belongs in civilian hands.

The second is that until the technology of atomic energy is better understood and the safeguards are devised to reduce the hazards of its use, the normal role of private enterprise in the development of a natural resource must be restrained, and public ownership maintained.

The third point is that until controls are established on the international level to prevent the military use of atomic energy, we can not, as a nation, afford to disclose these secrets which make this new force the most deadly form of military weapon.

The fourth policy point is that we must not relax our efforts to probe deeply into the facts of nature to derive increasing knowledge of atomic energy, both to supplement our defenses and to open new opportunities for peaceful progress.

As to the first of these principles, I have concerned myself since becoming President with the difficult problem of balancing the civilian and military interests in atomic energy. It was my grave responsibility to make the decision which resulted in the first use of atomic weapons in time of war. Ever since that time, I have sought to eliminate atomic weapons as instruments of war, by seeking through the United Nations to put the control of the dangerous aspects of atomic energy beyond the reach of any individual nation.

At the same time, without losing hope of achieving international control, I have directed that every effort be made toward maintaining the leading position of the United States in the knowledge of nuclear energy and its military applications.

Today we possess powerful atomic weapons. The recent tests conducted jointly by the Atomic Energy Commission and the armed services in the Pacific have demonstrated beyond any question that our position in the field of atomic weapons has been substantially improved. Such advances vindicate the faith of the American people in the principle of civilian control of atomic energy.

The progress which has been achieved under the present allocation of responsibilities is itself strong proof of the capacity of civilians and military men to work together in a common cause.

As President of the United States, I regard the continued control of all aspects of the atomic energy program, including research, development and the custody of atomic weapons, as the proper functions of the civilian authorities. Congress has recognized that the existence of this new weapon places a grave responsibility on the President as to its use in the event of a national emergency.

There must, of course, be very close cooperation between the civilian commission and the military establishment. Both the military authorities and the civilian commission deserve high commendation for the joint efforts which they are putting forward to maintain our nation's leadership in this vital work.

The Government of the United States holds in trust all our fissionable materials and production facilities. These are being used, on an increasing scale, to speed the discovery of applications of atomic energy to industry, agriculture, and public health.

The Atomic Energy Commission reports that recent experiments hold out the promise of more efficient production on the farm and in the factory and of an increase of mechanical and human energy for doing the world's work.

While this program is directed by an agency of the Government, the plants and laboratories are operated by leading industrial and research organizations through contracts with the Federal Government.

I hope that, in due course, the Government will be able to permit greater participation by private industry in the development of atomic energy. When that time arrives, our industries and research organizations will be well prepared to carry forward the applications of atomic energy which will provide better living and better health for our people.

(Continued on page 288)

OFURTH SEMI-ANNUAL REPORT OF THE UNITED STATES ATOMIC ENERGY COMMISSION

In the past, we have given extensive condensations of the US AEC Commission's semi-annual reports (Vol. 3, No. 9; Vol. 4, No. 3). The fourth such report, made on July 1, 1948, consists of several rather heterogeneous parts, the most extensive of which is a long review of the various uses to which radioactive isotopes, produced in the Commission's laboratories, have been put in research and industry. Below, we present in slightly condensed form, Chapter I, which deals with the Eniwetok operations; Chapter IV, dealing with the atomic power problem, is given in full. We hope to be able to present a condensation of the rest of the report—in particular, of the isotope progress report—in the next issue.

CHAPTER I.
PROVING GROUND OPERATIONS

On May 17, 1948, President Truman announced that three atomic weapons of new and improved design had been tested at the AEC Proving Ground on Eniwetok Atoll in the Marshall Islands. The announcement marked the completion of the first series of tests at the proving ground, which is being conditioned and placed in standby status for further use.

In its Second Semiannual Report to the Congress, transmitted July 22, 1947, the Commission stated that it was establishing proving grounds in the Pacific for routine experiments and tests of atomic weapons. In the Third Semiannual Report submitted in January of 1948, the Commission stated that its goal in the field of weapons development was the scientific and engineering perfection of improved designs, and that thorough testing of weapons and components is necessary to the attainment of this objective.

In any program designed to accomplish the effective development and production of weapons, the need for proof testing or the conduct of full scale experiments is a natural requirement. Failure to test developments would soon throttle the design of improved weapons. America's pre-eminence in the field of atomic weapons is not static. It depends upon achievement fully **proved** through tests and upon the observation by scientists of nuclear phenomena that can only adequately be studied by actual full scale test operations.

During the period of wartime development of atomic energy the one goal relentlessly pursued was the creation of an atomic bomb which would work—and work in time to be effective during World War II. It had only to work, it did not not need to be too efficient; and the related problems of engineering and production were dealt with accordingly during the emergency of war.

The bomb did work. It worked during the war and also a year later at Bikini. But all of these weapons as far as their state of development was concerned were almost on a par. They were the wartime weapon—designed under extreme pressure and without regard for many problems which in the long run are of very great importance in the application of atomic energy.

With these considerations in mind, the Commission undertook the development of plans for the conduct of true field laboratory tests designed to determine whether the new designs under development by the Commission would work and to determine their efficiency and from the knowledge thus gained to proceed as rapidly as possible to further advances in design.

Initial planning for the tests began in the spring of 1947, when the necessity for such tests was apparent to the Los Alamos Scientific Laboratory of the Commission. The Commission and its General Advisory Committee and a majority of the Military Liaison Committee approved the test recommendations. The President authorized the tests. Thereupon a site was selected, and the Commission asked the National Military Establishment to prepare the proving ground and to provide necessary logistic support. A number of agencies of the Military Establishment were also asked to participate in the operations, and to supply technical and other personnel. Among these were the Armed Forces Special Weapons Project, the Naval Research Laboratory, the Naval Ordnance Laboratory, the Army's Aberdeen Proving Ground, and the Navy's David Taylor Model Basin.

Through the cooperation of the Secretary of Defense, Joint Task Force Seven was created on October 18, 1947, for the purpose of readying the proving ground and aiding the AEC in certain of the scientific, technical, and administrative phases of the test program.

Joint Task Force Seven was an integrated effort on the part of the AEC, the Armed Forces, civilian scientists, and other specialized civilian elements. As the agency charged with responsibility for the proof-testing of weapons, the Commission was eminently satisfied with the conduct of the proving ground operations and was impressed with the efficiency of the combined Army-Navy-Air-AEC organization directed by Lieut. General John E. Hull, U. S. Army, Commander of the Task Force. In a public statement on the tests, given at a press conference at Fort Shafter, General Hull said, in part:

"As a military organization, Joint Task Force Seven is unique. It was organized along the lines of our best wartime experience, but there was an additional element. As a part of the organization we had a Task Group which was essentially civilian in makeup. This was the Scientific Group, which conducted the actual tests and which recorded and is still analyzing the results. Captain James S. Russell, U. S. Navy, who is Deputy Director of the Division of Military Application of the AEC, headed this Task Group as Test Director, and Doctor Darol K. Froman, as Scientific Director for the Proving Ground, headed the Task Unit of scientists within the Task Group.

"The operation of Joint Task Force Seven, thus organized, was the ultimate in integrated effort. Much credit for this accomplishment is due Dr. Froman. . . .

"All of us have been equally impressed with the scientific competence, the technical skill, and the sound judgment of the civilian scientists and technicians assembled for these tests.

"The military staff of Joint Task Force Seven included Rear Admiral William S. Parsons, USN, and Major General William E. Kepner, USAF, as Deputy Commanders.

"The major portion of the Joint Task Force sailed from Pearl Harbor on 8 March in ships of the Naval Task Group. Flagship of the force was the command ship USS MOUNT McKINLEY, veteran of the Pacific war and of the Bikini atomic tests. The four ships of the convoy had aboard the principal participants, both scientific and military. Construction of the proving ground had been commenced in late December 1947 by General Ogden's Army units, in accordance with plans developed in coordination with the Scientific Group. Some of our construction was performed by civilian contract.

"One of the most extensive construction projects was that of signal communication. . . . Nearly 1,000,000 feet of submarine cable was laid under direction of the U. S. Coast Guard.

"During the period of construction and preparation for the tests some 50,000 measurement tons of material, supplies, and equipment were shipped from the mainland and from Oahu to the test area. . . .

"The over-all strength of the Joint Force was approximately 9,800 including civilian personnel.

"Observers of the tests included members of the Joint Congressional Committee for Atomic Energy and its staff, the AEC, and the Armed Forces. No other observers were permitted.

"To sum up, aside from the value of the tests themselves, the operation was one of great profit to the Armed Forces. Valuable training in joint operations was gained. . . . Such experience is invaluable in fostering integration within the Services."

The tests were carried out during the months of April and May of this year and involved three nuclear explosions carried out under conditions as close to laboratory control as possible, and with very extensive instrumentation.

Technical and experimental work was primarily designed to obtain answers to specific questions arising in connection with the instantaneous release of nuclear energy for its explosive effect. Subsidiary to the scientific aspects, there was a second group of observations carried out by several agencies of the Armed Forces, designed to fill in the gaps in the knowledge sought at Bikini with respect to the effects of atomic explosions on material and equipment.

It should be pointed out that investigative emphasis at Eniwetok was placed on the scientific aspects because new designs of weapons were being tested, whereas at Bikini the principal emphasis was placed on measurement of the effects of the nuclear explosion, rather than on the generation of nuclear explosion itself.

Much of the technical data recorded at Eniwetok is, of course, still being analyzed and evaluated. The results are generally clear, however, and the tests proved not only the effectiveness of the new designs of weapons but confirmed a great deal of the theoretical and experimental work performed at the Los Alamos Scientific Laboratory since the war. The experimental data gained at Eniwetok is important to future research and development, both for weapons and for non-military areas of knowledge and application.

CHAPTER IV. ATOMIC POWER

(This chapter is a report to the Atomic Energy Commission by its General Advisory Committee* stating the Committee's evaluation of the prospects for useful power from nuclear energy).

This paper proposes to discuss considerations that will determine the answers to the questions:

When shall we have heat and power from atomic energy?

On what scale will this be available?

How much will it cost?

Even if a full account of the events of the next decades were available to us, we would have to give a fairly complex answer to these questions. Thus, the first instances of the generation and uses of heat or power are likely to be on a small scale and be uneconomical. Further development may increase the scale without substantially improving the economy, and many steps surely lie between the present and the ultimate future in which atomic power is possible, economical, practical, and abundant.

At present, there already exist nuclear reactors which produce atomic power as a byproduct but not in a usable form. The large reactors at Hanford, made up of natural uranium and graphite and used in the production of plutonium for atomic bombs, generate great quantities of heat at low temperatures, and this heat is carried away in the water of the Columbia River. The much smaller uranium graphite reactor at the Oak Ridge National Laboratory, used for research purposes and for the production of radioactive isotopes, generates heat which is dissipated in the air. A similar reactor is under construction at the Brookhaven National Laboratory. The uranium-graphite and the uranium-heavy-water reactors at the Argonne National Laboratory are used for research purposes and their small energy outputs are also wasted. The reactors at the Los Alamos Laboratory, made up of enriched uranium or plutonium and used for research in connection with atomic bombs, operate at a very low power and dissipate their heat into water or into the air. Thus, none of the reactors now in existence produce usable power. However, all of these reactors supply valuable information for the development of power reactors.

There are numerous scientific and technical problems that must be solved before atomic power can become a practical reality. Some of these are connected with generating at high temperatures, for no other sound method of applying atomic energy usefully as energy has as yet been proposed. This problem of high-temperature energy generation is essentially one of finding suitable materials for use in a nuclear reactor, suitable forms for the fuel, for structural elements, for coolants, and for moderators. But even in a program focused primarily on high-temperature energy, novel considerations limit the kinds of material which can be used. Thus, any reactors must include one of the two fissionable elements, uranium and plutonium. Materials of the reactor must be able to withstand not only high temperature, but the high levels of radiation which are necessarily present if the power is not to be altogether trivial.

To these obvious and necessary requirements, further desirable but optional criteria must be added. For example, it is undesirable to use in a reactor materials which absorb

*Members of the AEC General Advisory Committee are: Dr. J. Robert Oppenheimer, Director of the Institute for Advanced Study, Princeton, N. J., chairman; Dr. James B. Conant, President of Harvard University; Dr. Lee A. DuBridge, President of California Institute of Technology; Dr. Enrico Fermi, Professor of Physics at the Institute for Nuclear Studies, University of Chicago; Dr. I. I. Rabi, Chairman of the Department of Physics, Columbia University; Hartley Rowe, Vice President and Chief Engineer of the United Fruit Company; Dr. Glenn T. Seaborg, Professor of Chemistry at the University of California; Dr. Cyril S. Smith, Director of the Institute for the Study of Metals, University of Chicago; Hood Worthington, E. I. duPont de Nemours & Co., Inc.

many neutrons, since the investment in nuclear fuel would thereby be increased and its conservation impaired. It is undesirable to use materials or reactor designs which give a very short life without recharging, since this not only works against economy because of the cost and inevitable losses in reprocessing reactor components and fuels, but also limits the adaptability of the source of power. It is undesirable to build reactors in which the power per unit of fuel invested is very low, since this will clearly involve rather large capital fuel costs. It is desirable that the reactor design have as little net consumption of fuel per unit of power as possible, or even that it have a net gain of fuel, a so-called breeding, as power is generated. All of these considerations bear on increasing the possible scale and decreasing the probable cost of atomic power.

However, it is likely that in many early reactor designs these criteria will not be adequately satisfied. These reactors will involve relatively large charges of fuel, relatively low power per unit of fuel invested, frequent recycling, and a high net consumption of fuel per kilowatt obtained. They will also probably operate at moderate temperatures where the thermodynamic efficiency is low and where certain specialized applications may not be possible.

Two reactors are now authorized for construction which should produce atomic power and which should be completed within the next two or three years. Neither unit can conceivably rate as an economic producer of power. But, as a result of experience gained in these, and their successors, there will start a program of reaching higher temperatures and at the same time satisfying some of the criteria necessary for practicality and economy. Fairly practical reactors, that might be useful for special purposes, may then be available on an experimental basis within a decade.

The widespread use of atomic power will also depend on the availability of nuclear fuels. There are three possible nuclear fuels—uranium 235, uranium 233, and plutonium 239. Uranium 235 occurs to the extent of only 0.7 percent in natural uranium and can be used either in that highly dilute form, or after preliminary enrichment in isotope-separation plants. It is the natural source of all nuclear fuels. Plutonium and uranium 233 are artificial nuclear fuels obtained in the first instance by absorbing some of the extra neutrons from the fission of uranium 235 in either uranium 238 (the inert part of natural uranium) or in thorium. These elements, once formed, can be separated by chemical means from their parents, a simpler process than the physical separation of isotopes but fraught with great difficulties because of the enormously high radiation levels.

The selection between the various types of fuel will be, in the long run, a matter of economics and availability. If uranium ores should be found to be very plentiful even if low grade, it would probably be cheapest and best to use natural or, if needed, slightly enriched uranium as a fuel directly. The fuel might then be discarded without chemical treatment after, say, one percent had been utilized, which would give about 100,000 kilowatt-hours of heat per pound of the original material.

In anticipation of a rapidly growing shortage of uranium, great attention has been given to "breeding", a process in which plutonium or uranium 233 is produced by the power reactor at a rate greater than its consumption. It is theoretically possible—but in practice will be very difficult—to build an industrial reactor that will cause excess neutrons to be absorbed in a blanket of either U 238 or thorium, producing plutonium or U 233 which can serve as new fuel to continue the operation indefinitely as long as new natural uranium or thorium is supplied. This greatly increases the availability of fuel, for most of the uranium, not just the small 235 fraction of it, is consumable, and moreover the larger resources of thorium also can be used. It might even be possible by these means to build up fissionable material faster than it is consumed.

Nevertheless, the engineering difficulties associated with breeding are enormous. The conditions which have to be fulfilled to obtain high neutron economy are difficult to reconcile with those needed to obtain a high power output for a given material investment. There are acute chemical engineering problems associated with the repeated treatment of partly depleted fuel and the extraction of new fissionable material from the uranium or thorium blanket. Such procedures are complicated by the enormous radioactivity and have to be repeated many times before the fuel is completely consumed. The process must give virtually complete recovery at each stage if the physical reproduction is to be reflected in active material stocks.

Another very important factor in the possibility of widespread use of atomic power will be the cost of uranium. At the price of uranium compounds before the war, the cost of uranium fuel would compete with coal under almost any condition. However, the available supply came from fairly rich ores and was fairly limited. It may be assumed that the supply could be increased through intensive geological research and prospecting. Large use of uranium, however, will certainly drive the mining industry to the exploitation of poorer and poorer deposits. The cost will be determined by the cost of handling large amounts of rock, although it may conceivably be reduced by the sale of useful byproduct minerals.

If unfavorable assumptions are made about the cost of uranium and the technical practicability of breeding, the result is that atomic power would not compete with coal power in the United States except in regions where the cost of transportation of the fuel from the mine is the determining factor, or under other special conditions where the small bulk and weight of the uranium fuel are particularly valuable. On the other hand, if favorable assumptions are made about the cost of uranium and the technical practicability of breeding, the ultimate capacity may become comparable to and even larger than the present coal industry and will operate at a lower cost, at least as far as fuel expenditure is concerned. At the present time, sufficient knowledge does not exist to make a definite choice between these two alternative possibilities. It should be pointed out that, in either case, the cost of a nuclear-fuel power plant will be substantially greater than that of a coal-burning plant of similar capacity.

Even on the assumption of a most favorable and rapid technical development along these lines, a word of caution is needed as to the time scale. We do not see how it would be possible under the most favorable circumstances to have any considerable portion of the present power supply of the world replaced by nuclear fuel before the expiration of 20 years.

THE ATOMIC ENERGY ACT: PUBLIC ADMINISTRATION WITHOUT PUBLIC DEBATE

Herbert S. Marks

The following is an analysis of the difficulties associated with the stimulation of objective public discussion concerning the work of the Atomic Energy Commisson. It should be read in conjunction with those appearing on pages 277 and 280. Herbert S. Marks is General Counsel for the Atomic Energy Commission; he was formerly Assistant General Counsel of the War Production Board and Special Assistant to the Undersecretary of State. This article is reprinted from the Summer Issue of THE UNIVERSITY OF CHICAGO LAW REVIEW*

In the midst of noise it is difficult to perceive areas of silence. Since the appointment of the Atomic Energy Commission in October 1946, millions of words have been published about the administration of the Atomic Energy Act.[1] But the very quantity of material has obscured the fact that critical analysis and insight have been negligible. Even more remarkable, the range of issues which has excited any active public debate has been exceedingly limited despite the many intrinsically controversial questions with which the Atomic Energy Act is concerned.

Actions of the Atomic Energy Commission that are the subject of press release are duly reported in the newspapers—but rarely with more penetrating comment or follow up than that which accompanies the society news. The old argument over military versus civilian control has some continuing vitality; whether or not the secrets of the atomic bomb are being securely kept also gets attention; the patent provisions of the law and their administration are discussed in professional quarters.[2] The list could be extended, but not significantly.

Of late a handful of informed appraisals have appeared concerning such matters as the relationship of the Commission's program to business,[3] the Commission's special problems with respect to loyalty investigations, and the status of research at Oak Ridge.[3a] What is strange, however, is not so much the infrequency of perceptive commentary: The striking fact is that neither in depth nor scope is the public discussion which prevails for other government affairs even approximated in the field of atomic energy.[4]

Most recently the Congressional controversy over the reappointment of the Commissioners might have been expected to stimulate critical review of the broad field of operations of the Atomic Energy Commission. In fact, however, what has been observed in these legislative proceedings is little more than a series of election year maneuvers. [4a]

The absence of wide debate and criticism concerning the administration of this far reaching law is a phenomenon unique in the conduct of important public affairs. There are, of course, strong reasons for this peculiar situation. Some, like the requirements of secrecy, will appear obvious; others may appear more subtle. The significance of the unusual present conditions will be clearer, however, if first viewed in the light of the normal attitude toward public affairs.

Tradition of Public Appraisal Not Observed Concerning AEC Practices

Throughout the history of this country we have rarely tolerated departure from the principle that the chief protection of society against incompetence, unfairness, and corruption in government is the unlimited opportunity for public scrutiny and protest. We have believed also that this is the chief means of assuring that officials will pursue the course upon which the public is set. Sixty years ago Lord Bryce observed "a healthy and watchful public opinion" as a commonplace of the American political system: "Mischief is checked in America more frequently than anywhere else by the fear of exposure or by newspaper criticism in the first stage of a bad scheme."[5] And in a current opinion the United States Supreme Court quotes Bentham's century-old observation: "Without publicity all other checks are insufficient; in comparison of publicity all other checks are of small account. . . ."[6]

In observance of this principle, the physical and social sciences could find their most important common ground. Science, says a distinguished physicist, "is not a field in which error awaits death and subsequent generations for verdict—the next issue of the journals will take care of it."[7] Perhaps the test of our faith is our firm belief that it is the fatal weakness of communism and all other forms of totalitarianism that they can find no substitute for the self-correcting process of open discussion and criticism which is the democratic tradition.

We pay a high price to maintain this tradition. Ordinarily there is no need to encourage criticism of large government enterprise; the danger is rather that it goes too far. The able administrator is harassed and disgusted, the timid administrator is paralyzed, public affairs suffer from endless delays. Yet even in the conduct of the war agencies, whether civilian or military, we have insisted upon this principle. On balance we have always been convinced that the price was not too high. Nevertheless, in the case of the administration of the Atomic Energy Act critical debate has been largely absent.

The lack of such discussion by no means signifies an inactive atomic energy program. We know that the Atomic Energy Commission operates a capital investment of three billion

* The author is deeply indebted to Mr. John G. Palfrey, a member of the Legal Staff of the Atomic Energy Commission, for his invaluable assistance and suggestions throughout the preparation of this article. The opinions expressed, however, are the personal views of the author.

dollars; that is spends well in excess of a half billion dollars annually; that it employs 60,000 people; that it has important business relations with hundreds of business concerns and educational institutions; and that its regulatory activities affect business, the press, and other private institutions. We profess to know that there is no activity of government more important than the Atomic Energy Commission, by which presumably we mean that there is none which now or potentially affects us so vitally. [7a]

Nor is it really possible that the absence of debate and criticism is simply a reflection of the high public respect and confidence which the present Commission and its staff rightly commands. Our theory and practice are such that it is a matter of indifference whether government officials are able and incorruptible public servants—a David Lilienthal or a General Groves—or suspected machine politicians.

The public servant, on his part, is rarely aware that the pressures and attacks from which he suffers during all his official life are frequently a source of strength and almost always a source of guidance. It is public pressure which helps weed out incompetent associates when official inertia would retain them. It is an interested, critical public which often supplies the only adequate forum for resolving conflicts between executive agencies, between Congress and the Executive, or between government agencies and special interests. Above all, it is the public reaction to what he does or fails to do which tells the administrator what is expected of him. It is his duty to provide leadership, but leadership in the direction of the public's expectations.

But how can the Atomic Energy Commission be responsive to the impulses and expectations of a society which in relation to this subject matter are not expressed, which seemingly are not even felt? The men who compose the Atomic Energy Commission have been conscious of the vacuum in which they operate and have sensed the dangers which it portends. For many months in their reports and speeches, they have made eloquent pleas to the public to get educated about and take an active interest in atomic energy.[8] Mr. Lilienthal has warned that without such "active participation in these fateful matters the substance democracy is lost."[9]

To these pleas the most common public response appears to be: "What is it that they want us to know? Why don't they tell us? Then we may know what to do."[10] The pleas have somewhat puzzled the public; the public response has somewhat puzzled the Atomic Energy Commission.

Meanwhile, the normal interplay of forces between the government and the governed does not take place. In the field of atomic energy, the process which has always been our main reliance for a healthy direction of national effort is virtually non-existent.

AEC Has Found No Substitutes for Public Evaluation

Nor have any adequate substitutes for the usual processes of public criticism been found. The two that are sometimes referred to as assuring a measure of public accountability, the Congressional Joint Committee on Atomic Energy and the Commission's public advisory committees, are certainly of great value, but they alone are not sufficient.[11]

We know from its recent reports to the Congress that the Joint Committee, established by the McMahon Act and composed of nine members of the Senate and nine members of the House, is generally interested in all activities of the Commission.[12] We may assume, too, that it takes a critical attitude toward these activities and that the Commission benefits from this attitude.[13] But there has been even less public discussion and comment about the Joint Committee and its work than there has been about the Commission. Fortunately, the membership of the Joint Committee of Congress includes some of our most trusted and respected legislators.[14] But just as we rely upon the self-correcting process of public scrutiny in the case of all agencies of the executive branch, good or bad, so too we may be apprehensive of an arm of the Congress, however distinguished its members, whose activities are not the subject of public debate. As long as this condition lasts, it must not be assumed that the Joint Committee will provide an adequate device to assure public accountability in any usual sense. The unreviewed action of eighteen legislators is not likely to be better than the unreviewed action of five administrators. In fact, such a situation could easily lead to an unwholesome domination of executive action by a small group of legislators which would not be tolerated if the public were alert and critical.

The Advisory Committees, too, are important in establishing connection between the atomic energy program and the country at large. The General Advisory Committee created by the McMahon Act, and the numerous other committees set up by the Commission as authorized by that law, bring to bear upon the problems of the atomic energy program the diverse talents of leaders in many phases of American life.[15] But however valuable this form of participation by "outsiders" may be, it is not a substitute for the kind of public scrutiny to which we have been accustomed. It is indeed as different from what we have relied upon in the past as it would be to preserve the principle of jury trial in criminal proceedings but to permit the trials to be conducted in secret without the presence of press or public.

Secrecy Requirements Do Not Explain Lack of Discussion

Perhaps the requirements of secrecy are such that there can be no public participation in the problems of atomic energy in any customary sense. As the question is subjected to analysis, however, this answer may appear less clear. At all events, while secrecy may seriously inhibit debate, that factor alone hardly accounts for the silence of the interests that are directly affected by the atomic energy program.

Procurement of raw materials, letting of contracts, construction and operation of plants involving hazardous new industrial processes and hazardous industrial waste products, administration of regulatory powers—all these activities and many others in this three billion dollar enterprise are in fact affecting the public at many points.

These Commission actions fall in areas of public sensitivity which, judging by the experience of all other government agencies, should produce a vocal response from those groups which are disappointed by Commission decisions. Indeed, some decisions of the Commission occur in the most sensitive areas of public concern. The effect which Commission action has upon the press itself is the best example.

Under Section 10 of the Atomic Energy Act the Commission is given broad powers to control the dissemination of restricted data. Simply stated, practically all information relating to atomic energy is classed as restricted by the Atomic Energy Act.

The Commission is authorized to remove information from this category whenever it concludes that it may be published without impairing the national security. We need not concern ourselves here with the question which is sometimes raised as to whether the law is merely an official secrets act or whether it includes broader censorship powers.[16] The press and the publishing industry have apparently accepted the principle that whether or not the Act, strictly construed, applies to unofficial as well as official secrets, they will publish nothing in the face of advice by the Commission that publication would be prejudicial to the national security.[17] In short, for practical purposes, they seem to have accepted in the field of atomic energy an arrangement somewhat similar to the one which existed more generally during the war under the Office of Censorship.

This voluntary restraint on the part of the press and the publishing industry, and their wholehearted cooperation with the government in maintaining security, are deserving of highest praise. But what is surprising is that there has not been any open debate concerning the details of administration. How does it happen that the public bickering between press and government over the scope and details of censorship so frequently observed in connection with the war agencies does not occur here?[18] Are we then to conclude that the Commission's "security guidance" has been so satisfactory to the press that there has never been occasion for debate concerning it or public notice of the debate? Considering the diversity and character of the American press, there must be other explanations for the unbroken silence that exists in this area of legitimate discussion.

There are many other areas of activities and many incidents in the atomic energy program where, despite secrecy, lively concern and comment on the part of the public might be expected but where almost none has occurred. The Commission's decisions with respect to its Clinton Laboratories is a good illustration.

In May 1947 the Commission publicly announced that the contractor for the Clinton Laboratories at Oak Ridge would be changed because the then contractor was unable to manage the laboratory unless it was transferred to a new location remote from Oak Ridge.[19] It was explained in the release that "the Clinton Laboratories constitute a vital part of the atomic energy program and certain projects at Clinton are among the most important in this field." "After comprehensive review," it was said, "the Commission has concluded that in the light of the overall research and development program in atomic energy, the work of the Clinton Laboratory must continue at Oak Ridge." In September 1947 it was publicly announced that a new contractor had been selected for the Clinton Laboratories.[20] In addition to naming the new contractor, it was announced that fourteen southern universities and a score of industries and industrial representatives would participate in the important research, development and training programs at the laboratory. On January 1, 1948, the Commission announced a drastic realignment in the September arrangements for the Clinton Laboratory.[21] Important work conducted at or contemplated for that location would be transferred to Chicago. In addition, the contractual arrangements originally forecast in the September release were to be fundamentally altered and a third contractor was to enter the picture. All these changes were duly reported in the Commission's release.

The three public releases of May, September, and January described major decisions concerning major industrial interests, major university interests, major geographic interests, major alternatives of national policy. It is not at all clear from the face of the three releases that they are consistent with one another. Were any other important government agency to issue three such announcements about one of its main operations, the press and affected interests would immediately engage in a storm of public discussion. Such discussion would occur if only because the watchful journalist would discern that on their face the three announcements appear to be contradictory. But such discussion would even more certainly occur in the case of other agencies because important decisions and successive changes in them would inevitably disappoint or at least disturb some of the special interests affected by them. It seems highly improbable that the Commission, alone among government agencies, possesses a Solomon-like faculty for always harmonizing and satisfying all affected interests.

The point of this recital is not to suggest that the Commission's actions as reflected in these announcements were wrong. The point is that almost no one among our individualistic, normally critical public was impelled to debate them openly. No one was impelled to debate them even though on the face of the releases themselves, without going further for information, there was ample material to excite public discussion.[21a]

Factors Preventing Public Discussion of Commission's Activities

Secrecy is certainly the most important factor in accounting for public inertia in relation to the administration of the Atomic Energy Act. In the present state of world affairs, the requirements of security altogether remove from public view certain activities and certain problems of the Atomic Energy Commission. In addition, there is everywhere an air of secrecy which seems impenetrable, even when it is not. The mere mechanics of securing a pass into a Commission installation for a routine interview appear formidable, even for the visitor who knows he is entitled to the pass. The areas of information that are shut off for reasons of security inevitably seem to obscure those which are open. No matter how much the questioner may be assured that he can understand what he needs to know without access to what is hidden, he always has a lurking uneasiness that his interpretation of what is in sight will be distorted by what is unknown.

Much of the subject matter—even that which is completely open—is technically complex, and therefore hard to understand. It is not only complex, it is totally unfamiliar. One of the Commissioners has suggested that the subject of atomic energy is less complex than taxation.[22] But when Franklin wrote "Nothing is more certain than death and taxes", he gave expression to a thought already thousands of years old. The background of ancient familiarity, not to mention suffering, makes it relatively easy to do in the field of taxation what the Commission urges us to do here; that is, distill "out of very complex and superficially bewildering things, relatively simple, quite comprehensible basic issues that the people are capable of understanding."[23]

There is, moreover, a general frame of mind which inhibits the active curiosity without which scrutiny and debate does not take place. A taboo-like quality attaches to atomic

energy, which is perhaps no more than another way of saying that the immense proportions of the new physical force, the seeming magic and real mystery connected with it, its tradition-shaking consequences, and the walls of secrecy and epic drama which surrounded it from the first, make of it a subject from which we instinctively shy away.

Also important in suppressing curiosity is the belief that to ask questions in this field is unpatriotic. We have come to feel that because it is wrong to disclose secret information it is somehow wrong and possibly illegal for the uninitiated to seek information about the subject.

In addition, large and important sectors of the public and the press seem to have been restrained from any generally critical scrutiny of the administration of the Atomic Energy Act, perhaps unconsciously, by a sense of partisanship. These sectors of press and public joined in the fight to secure enactment of the McMahon Bill.[24] Hardly had the bill become law before another fight took place over the confirmation of the President's nominees for membership on the Atomic Energy Commission. The same forces, construing the opposition to the President's nominees as a renewal of the original effort to defeat the McMahon Bill, again joined to support the President's appointments.[25] That the Bill was enacted after a notable unanimity in the vote of the Senate committee which sponsored it, and that confirmation was voted by overwhelming majorities, were regarded not as evidence of the weakness of the opposition, but rather of the strength of the forces that were marshaled in support. Ever since, the feeling has persisted that at the first opportunity these original opponents would reassert themselves to destroy the McMahon Act. In these circumstances, the supporters of the Atomic Energy Act and of the President's nominations to the Commission seem to have assumed that any display of critical attitude toward the administration of the law would play into the hands of these opponents.

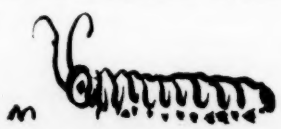
There may be other factors at work in preventing the free play of the normal forces of public scrutiny and criticism. Because so many of the barriers are intangible, it is extremely difficult to assess their relative importance. But secrecy, security, complexity, unfamiliarity, self-restraint—whether occasioned by taboos, suppression of curiosity, or partisanship—together compose a formidable array. We may hopefully agree with Mr. Lilienthal that "there is nothing in the nature of atomic energy, nor in the necessary requirements of secrecy in certain areas of knowledge that prevents the people as a whole from exercising their historic role of judging what shall be the course of public policy."[26] But the people are not now exercising that historic role and it is plain that if they are to do so very special exertions will be required of them.

Process of Criticism Must Commence

The fact that the traditionally powerful forces of public scrutiny and criticism do not now exist in this field in itself suggests the difficulty in devising a program to create for the Atomic Energy Commission the public environment of other governmental agencies. A beginning has been made in the speeches of the members of the Atomic Energy Commission during past months. The awareness of the problem that they reflect, and the emphasis they have given in many forums to the need for public interest and education should contribute materially to the creation of a climate favorable for public action.

It will also help if we become conscious of misconceptions that have interfered with the normal process of scrutiny and criticism. Active curiosity, far from being improper or illegal, is a normal, lawful public responsibility.[27] It has been asserted on behalf of the Commission that "by and large the sources of information on public issues are already open."[28] And it is a fair estimate that the official material made available by and about the Commission up to the present time compares in quantity and content with the official material that is made available about other large government operations in a comparable period of operation.[29]

It takes active curiosity on the part of the press and public to give meaning to official handouts, no matter how enlightening the government tries to make them. The official material of other government agencies is subjected to searching public analysis and questioning which uncovers and evaluates the reasons behind decisions and the consequences implicit in them. Because of security restrictions, an effort to subject the available materials about the Commission to the same treatment would sometimes be frustrating. Surprisingly often, however, the results would be illuminating.



It should be understood that the general public on the one hand and the Commission on the other have different responsibilities in respect to security. It is the duty of the Atomic Energy Commission under the law to see to it that those things are kept secret which in the interest of national security should be kept secret. It is the duty of the public to cooperate with the Commission in this effort, and this the public has been doing with remarkable effectiveness.[30] But, as the Commission itself has repeatedly asserted, it is also a public responsibility to find out and to understand those things which need not be kept secret. This can only be accomplished through incessant questioning.

The Atomic Energy Commission is no more omniscient than any other Government agency in its capacity to determine precisely what information within its vast area of nonsecret knowledge the public needs to know. It is the duty of a democratic public to direct to its government every question that its curiosity provokes. It is the Atomic Energy Commission which must bear the responsibility of deciding whether an answer to any particular question may prejudice the national security.

Once this relationship is clearly defined, it will be possible for the public to begin to develop insights about the atomic energy program. Such insights can come about only through a constant interchange between the government and the people. The questions raised in Congressional hearings, in Congressional debates, in news stories and editorials, the questions raised by all manner of special interests—these and the government's answers to them, and the further questions thereby suggested, can produce a broad and endless process, through which understanding will evolve and influence will exert itself.

This process is especially necessary if the public is to overcome the difficulties growing out of the com-

plexity and unfamiliarity of the subject matter. The Acheson-Lilienthal Report and the Baruch proposals on international control of atomic energy were understood clearly enough in the course of the extensive discussion that they provoked. In comparison, the official material which has been published about the Atomic Energy Commission seems less complex. Once the same process of scrutiny, questioning, and discussion which illuminated the proposals on international control is brought to bear upon the available information in the domestic field a comparable measure of understanding can result.

Not only is it essential that there be an active curiosity about the atomic energy program—a curiosity which expresses itself in incessant questioning—there must also be willingness to criticize. Partisanship that exercises a restraint upon legitimate criticism out of a fear that such criticism will aid the enemies of the McMahon Act defeats its own purposes. The sectors of the press and public which thus refrain from critical comment are the very groups which by virtue of their participation in the fight on the McMahon Bill and on confirmation acquired an informed background on atomic energy. In refraining from criticism, these groups have no doubt spared the Commission a considerable amount of annoyance. But they have deprived the administration of the Atomic Energy Act of a much more important source of strength—the strength that comes from constructive exposure of weakness and error and the opportunity thereby created for correction.

In any effort to quicken the forces of public scrutiny and criticism, account must be taken of the attitude of public officials toward these forces, and particularly toward the quest for information which these forces stimulate. The usual but never tolerable condition of a government official is one of continual harassment by a seemingly specious, unfair and unsympathetic press and public. That this condition makes officials wary and that it often makes the process of getting information from a public agency difficult is not surprising. The fear of embarrassment which the official or his agency may suffer as a result of disclosing information can be a more important factor in deciding whether or not to answer a question than the public need for an answer.

These considerations are as relevant to atomic energy as to any other subject. The staff of the commission will be conscious that what they say may be used to discredit them, in ways that are frequently unfair and always painful. The members of the Atomic Energy Commission have urged earnestly and often that the public take a critical interest in their work. It should not be thought, however, that the express recognition by the Commissioners and their staff of the need for scrutiny will make the path of the questioner and potential critic easier than it would be with any other public agency. A party in power may assert that a strong opposition is essential to Democracy; but it cannot be expected willingly to supply what might be used as ammunition by its opponents.

In the case of the Atomic Energy Commission, there is, moreover, a special hazard to the process of debate and criticism. The line between what must be secret and what can be open is not a sharp one. When areas of information involving possible embarrassment are probed, the temptation must always be present to draw the line so that embarrassment will be avoided rather than to draw the line only where the reasonable requirements of security dictate. The danger is not that the Atomic Energy Commission or its staff would thus act deliberately. The danger is rather of unconsciously confusing the needs of security with the desire for self-protection from critical comment.[31] During the war, journalists developed a sixth sense which enabled the press to tell whether the Government's releases and its response to questions were really as full and frank as security would permit. This experience may ultimately be repeated in the field of atomic energy. But it will not be repeated as long as it continues to be possible to say that "only about a dozen newspaper reporters in the United States are equipped to write about atomic information accurately and with understanding."[32]

The absence of public scrutiny and criticism which the Atomic Energy Commission has so far experienced will not last indefinitely. The deep and powerful forces which have made our public alert and vocal in other public affairs will sooner or later assert themselves in this field. The question is not whether this will happen but when and in what form. If too long delayed, our atomic energy program will almost certainly grow so far out of touch with the American environment that when the forces of criticism finally begin to operate with their customary vigor they will produce drastic upheavals. Deprived of the continuous, corrective effects of public scrutiny, the atomic energy program will have developed so much that is weak and unsound that the public wrath which then seeks drastic change will be justified. By then the administration that is thus destroyed may not be worth saving. If this should happen, not only will the continuity essential to the success of the undertaking be destroyed, but the public, without the knowledge gained by prior participation in the problems of atomic energy, will not be in a position to insure the establishment of a sound administration in its place.

Any practical measures that may be proposed now for releasing the normal forces of critical scrutiny and debate will seem modest as compared with the proportions of the problem. What is important, however, is that the process commence. The best hope for constructive change lies in recognition of the fact that once started this process which is so close to our most basic traditions will find its own strength, and its own new channels for growth.

REFERENCES

1. 60 Stat. 766, 42 U.S.C.A. §1810 (Supp., 1947). The Act became law August 1, 1946. The President appointed the five members of the Commission on October 28, 1946. The properties of the Manhattan Engineer District were formally transferred to the Commission by Executive Order 9816 on December 31, 1946. But it was not until April 9, 1947 that the recess appointments of Commissioners and General Manager were confirmed.

2. On March 15, 1948 Senator Wherry, majority whip, introduced and spoke in favor of a bill to return atomic energy to military control. 94 Cong. Rec. 3574 (March 25, 1948).

   The most sensational security cases during the past year concerned the revelation that prior to the appointment of the Commission, two army sergeants personally appropriated highly secret documents from the Los Alamos reservation. See statement to the Senate of Senator Hickenlooper, Chairman of the Joint Committee on Atomic Energy, on July 7, 1947. 93 Cong. Rec. 8664 (July 9, 1947).

   On patent matters, see Ooms, Atomic Energy and U.S. Patent Policy, 2 *Bulletin of the Atomic Scientists*, No. 9 and 10, at 28, and No. 11 and 12, at 30 (1946); Miller, The First Official Report on AEC Patent Problems, 4 *Bulletin of the Atomic Scientists*, No. 3, at 77 (1948); Newman and

Miller, Patents and Atomic Energy, 12 Law & Contemp. Prob. 746 (1947); American Bar Ass'n, Section of Patent, Trade-Mark and Copyright Law, Committee reports to be presented at annual meeting September 1947, p. 11; First Report of Atomic Energy Commission Patent Advisory Panel, Atomic Energy Commission Press Release No. 56, Sept. 21, 1947.

3. "Atomic Energy—1948", Business Week, p. 47 (April 10, 1948).

3a. The New York Herald Tribune recently ran an impressive series of articles on the Atomic Energy Commission's loyalty investigations and on general conditions at Oak Ridge. See New York Herald Tribune, p. 1 (May 19, 1948); pp. 5, 22 (May 20, 1948); p. 18 (May 24, 1948). On loyalty investigations, see O'Brian, Loyalty Tests and Guilt by Association, 61 Harv. L. Rev. 592, 598 (1948).

4. See Report of the Chairman of the American Society of Newspaper Editors Standing Committee on Atomic Energy, Editor and Publisher, p. 22 (April 24, 1948). The New York Herald Tribune, the *Bulletin of the Atomic Scientists*, and Business Week show some signs of a level of reporting and comment in the field of atomic energy comparable to that which exists in other areas of public affairs; see New York Post, p. 41 (May 28, 1948): "The Herald Tribune is one of a few U.S. papers which realizes what atomic energy—and atom bombs—mean to the future of the world. . . ." As examples of high quality reporting and comment on atomic energy matters see Editorial, A Year of Civilian Control of Atomic Energy, 4 *Bulletin of the Atomic Scientists* No. 2, at 33 (February, 1948), and "Atomic Energy —1948," op. cit. supra note 3.

4a. Under Section 2 of the Atomic Energy Act of 1946 the terms of the Commissioners first appointed expire on August 1, 1948. The President on April 20, 1948 renominated the five members of the Commission for new terms commencing August 1, 1948, giving to the chairman, Mr. Lilienthal, a five year appointment, the longest permitted under the system of staggering prescribed in the Act. The Republican leadership in the Congress countered President Truman's move by proposing bills, S. 2589 and H.R. 6402, to extend the terms of the five Commissioners automatically for two years from August 1, 1948, thereby giving to the President elected in November, 1948 power to appoint an entirely new Commission during the next presidential term. The ground asserted by the Republican leadership for this action was the necessity of a further period of probation for the "overall evaluation of the atomic energy program and its theory of operation." See S. Rep. 1342, 80th Cong. 2d Sess. (1948); H.R. Rep. 1973, 80th Cong. 2d Sess. (1948). A minority, led by Democratic Senator McMahon, filed a report strongly attacking the bills, among other reasons, as a blow to "the spirit of political non-partisanship in which the entire program was conceived and established" under the original Act.

5. 2 Bryce, The American Commonwealth, 321 (2d ed., 1891).

6. In re Oliver, 68 S. Ct. 499, 506 (1948), quoting from 1 Bentham, Rationale of Judicial Evidence 524 (1827).

7. Oppenheimer, Physics in the Contemporary World, 4 *Bulletin of the Atomic Scientists*, No. 3, 65, at 68 (1948).

7a. For a general summary see address of David E. Lilienthal, The Business Side of the Atom, before the Chamber of Commerce of Boston, Massachusetts, March 18, 1948 (Atomic Energy Commission Press Release). As to regulatory activities of the Commission, the agency has issued regulations governing commerce in the raw materials uranium and thorium (12 Fed. Reg. 1855, March 20, 1947), and regulations governing commerce in facilities for the production of fissionable materials (12 Fed. Reg. 7657, Nov. 18, 1947); the Commission's "security guidance" service is similar in effect to the government censorship practiced during the war. See Third Semi-Annual Report of the United States Atomic Energy Commission, S. Doc. 118, 80th Cong. 2d Sess. at 27 (1948).

8. E.g., addresses of David E. Lilienthal, Atomic Energy is your Business, before a Community Public Meeting in Crawfordsville, Indiana, September 22, 1947; Democracy and the Atom, before the American Education Fellowship, Chicago, November 28, 1947; The People, the Atom and the Press, before the New York State Publishers Association in New York, January 19, 1948; Atomic Energy—Where Do We Stand Today? before the Radio Executives Club in New York, February 5, 1948; also the address of Sumner Pike, Imperatives in Atomic Understanding, before the National Education Association in Cincinnati, February 17, 1948, and addresses of W. W. Waymack, Education in the Atomic Age, before the Institute of Higher Education in Nashville, Tennessee, July 31, 1947, and Atomic Energy Implications, before the Illinois Welfare Association in Chicago, November 26, 1947. (Atomic Energy Commission Press Releases). See also Third Semi-Annual Report of the United States Atomic Energy Commission, op. cit. supra note 7, at 26-28.

9. Lilienthal, The People, the Atom and the Press, op. cit. supra note 8, at 8.

10. See, e.g., letter to the editor, What Do the Scientists Wish Us to Know, from L. McDonald, N. Y. Herald-Tribune, p. 16 (Feb. 23, 1948).

11. See Lilienthal, The People, the Atom and the Press, op. cit. supra note 8, at 14-16, and Waymack, Atomic Energy Implications, op. cit. supra note 8, at 10. See also Third Semi-Annual Report of the United States Atomic Energy Commission, op. cit. supra note 7 at 31-32, 34.

12. First Report of the Joint Committee on Atomic Energy to the Congress of the United States, H. Rep. 1289, 80th Cong. 2d Sess. (1948). The Committee was created by Sec. 15(a) of the Atomic Energy Act of 1946. See also the Reports on S. 2589 and H.R. 6402, op. cit. supra note 4a.

13. "The very fact of the existence of the Joint Congressional Committee is security against the exercise of arbitrary power by the Commission. While we on the Commission, vested with a kind of quite terrible responsibility find in it a great reassurance." Lilienthal, The People, the Atom and the Press, op. cit. supra note 8, at 16.

14. "The present membership of this 18 man permanent Committee is an indication of the importance Congress itself assigns to it in charting the difficult policy course ahead. Its Chairman is Senator Bourke B. Hickenlooper of Iowa, a former Governor of that State, a Member of the Committee on Foreign Affairs, an experienced administrator as well as legislator. Its Vice Chairman is Representative W. Sterling Cole. . . , who . . . is among the most respected and influential Members of the House, with long experience in matters of national security. The Committee includes the Chairman and the ranking Member of the Senate Committee on Foreign Affairs, Senators Vandenberg and Connally of Michigan and Texas; it includes Senator Brien McMahon of Connecticut, who as Chairman of the Special Senate Committee on Atomic Energy in 79th Congress sponsored the Atomic Energy Act and who follows with keen interest the international situation on atomic energy control; it includes Senator Eugene D. Milliken of Colorado, Chairman of the Finance Committee. On the roster of the Committee are other men of both Chambers most of whose names and reputations are familiar . . . . In all, the Committee is unusually broadly representative of the country, both geographically and in its group interests." Lilienthal, The People, the Atom and the Press, up. cit. supra note 8, at 15.

15. The list, membership, and functions of the numerous advisory committees are set forth in the Third Semi-Annual Report of the United States Atomic Energy Commission, op. cit. supra note 7, at 31-38. The General Advisory Committee was established by Sec. 2(b) of the Atomic Energy Act of 1946. The other advisory groups were set up by the commission pursuant to Sec. 12 (a) (1) of the Act.

16. See Newman, Control of Information Relating to Atomic Energy, 56 Yale L. J. 769 (1947), and Newman and Miller, The Control of Atomic Energy Ch. 10 (1948). These writers take the position that the prohibitions on disclosure in Section 10 apply equally to official and unofficial information falling within the broadly defined category "restricted data." While this view may be an accurate statement of the effect which the draftsman intended, neither the statute nor the legislative history seem sufficiently explicit on the point to avoid a question of statutory construction if the issue is ever tested. In that event, it is to be anticipated that questions of constitutionality would also be raised.

17. "It was—and is—evident that the public communications media of the Nation desire overwhelmingly to avoid harm to the national defense and security through publication of restricted data. There is a heavy continuing demand for security guidance service. . . ." Third Semi-Annual Report of the United States Atomic Energy Commission, op. cit. supra note 7 at 27.

18. Compare the immediate reaction to Secretary Forrestal's recent proposal to establish a voluntary system of censorship in connection with security matters in general. See, e.g., Security Consciousness, Editorial, Washington Post, p. 4B (March 28, 1948). The first significant criticism of Commission practice in this connection appeared at the end of May. See Editorial, Policy in Secret, New York Herald Tribune, p. 22 (May 29, 1948).

19. Atomic Energy Commission Press Release, Joint Statement of United States Atomic Energy Commission and Monsanto Chemical Co. at Oak Ridge, Tennessee (May 28, 1947).

20. Atomic Energy Commission Press Release No. 57, Clinton National Laboratory established at Oak Ridge (Sept. 25, 1947).

21. Atomic Energy Commission Press Release No. 80, Atomic Energy Commission Consolidates Reactor Research and Development at Argonne, National Laboratory near Chicago; Enters New Contract for Clinton National Laboratory at Oak Ridge and Adds Chemical Engineering Development at that Laboratory (Jan. 1, 1948).

21a. It was not until many months after the release of January 1, 1948 that critical public discussion of the Clinton Laboratories decision began to occur. See "Why Morale Sags at Oak Ridge," New York Herald Tribune, p. 18 (May 24, 1948).

22. Waymack, Atomic Energy Implications, op. cit. supra note 8, at 6.

23. Ibid.

24. A summary of these events can be found in Newman and Miller, The Control of Atomic Energy, c. 1 (1948).

25. During the opening remarks of the Senate debate on the confirmation of the Commissioners and the General Manager in March 1947, Senator Hickenlooper, speaking of Mr. Lilienthal, described the very significant and widespread "editorial approval of his appointment of leading newspaper editors of both major parties from coast to coast." 93 Cong. Rec. 2530 (Mar. 29, 1947).

26. Lilienthal, Democracy and the Atom, op. cit. supra note 8, at 8.

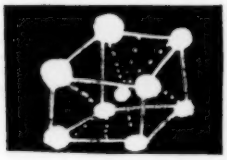
27. Actually, the criminal sanctions of Sec. 10 (b) (3) of the Atomic Energy Act apply to attempts to acquire information involving or incorporating "restricted data" only when the act is done "with intent to injure the United States or with intent to secure an advantage to any foreign nation." It can hardly be imagined that such intent could be read into any normal efforts of press and public to secure information about atomic energy. On the other hand, the provisions relating to disclosure of "restricted data" (Sec. 10) (b) (2) include sanctions when the person has "reason to believe" that the above consequences will ensure.

28. Lilienthal, Atomic Energy is Your Business, op. cit. supra note 8, at 11.

29. The list includes the following:
a) Commission Reports to Congress: The First Semi-Annual Report of the Commission, S. Doc. 8, 80th Cong. 1st Sess. (1947); the Second Semi-Annual Report of the Commission, S. Doc. 96, 80th Cong. 1st Sess. (1947); the Third Semi-Annual Report of the Commission, op. cit. supra note 7.
b) Congressional Hearings: Independent Offices Appropriation Bill for 1938, Hearings on H. R. 3839 before the Subcommittee of the Committee on Appropriations, U. S. Senate, 80th Cong. 1st Sess. at 46 et seq. (1947); Hearings before the Joint Committee on Atomic Energy on labor relations at Oak Ridge, Tennessee, 80th Cong. 2d Sess. (1948); Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, on First Deficiency Appropriations Bill, 80th Cong. 2d Sess. at 861 et seq. (1948); Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, on the Supplemental Independent Offices Appropriation Bill for 1949, 80th Cong. 2d Sess. at 747 et seq. (1948); see also H. R. Rep. 589, 80th Cong. 2d Sess., at 8 (1947); H. R. Rep. 2245, 80th Cong. 2d Sess. at 2 (1948); H. R. Rep. 1618, 80th Cong. 2d Sess. at 2 (1948).
c) A large number of reports and documents released by the Commission, including 1700 individual declassified documents made available to the public through the Office of Technical Services of the Department of Commerce; over seventy-five statements for press and public giving facts of new developments; reprints of public speeches made by members of the Commission; and reports of advisory boards of the Commission, namely, Report of the Medical

(Continued on page 288)

NEW LEGISLATION TO REPLACE THE MC MAHON ACT



Walter DeCew

Few concrete criticisms of the McMahon Act have thus far appeared in print. The BULLETIN in its January, 1948 issue published one such criticism by Karl Cohen. Below, we reprint a similar article from the July issue of NUCLEONICS by Walter DeCew, technical editor. A brief comment on this article by Edward Levi appears on page 280.

On August 1, 1946, less than one year after the first military use of the atomic bomb, the McMahon Atomic Energy Act was signed by President Truman.

The preamble of the McMahon Act explicitly stated that this law was not intended to be permanent legislation. Section (a), **Findings and Declaration**, declares: "The effect of the use of atomic energy for civilian purposes upon the social, economic, and political structure of today cannot now be determined. It is a field where unknown factors are involved. Therefore, any legislation will be subject to revision from time to time."

The McMahon Act set up machinery for the exclusive ownership and management of nuclear energy by the United States Federal Government. Although many reasons were advanced to support this policy, the principal argument which determined the consent of Congress and the American people was the expectation that international accord on the control of atomic energy would enable the United States to transfer this national monopoly to an international atomic energy authority, which would be vested with worldwide monopoly of atomic energy. This expectation was embodied in the Acheson-Lilienthal Report of March 28, 1946, and became official United States policy with the Baruch Proposals of June 14, 1946.

In May, 1948, after two years and more than 200 meetings, the United Nations Atomic Energy Commission admitted that Soviet Russia's agreement to these proposals for International ownership and management of atomic energy could no longer be hoped for. The majority delegates formally agreed to suspend the U. N. Atomic Energy Commission, with the declaration that "No useful purpose can be served by carrying on negotiation." This is a blunt statement that none of the members of the United Nations can count on integrating its domestic atomic energy organization into an international pattern.

It is imperative that we should now reconsider the commitments of the McMahon Act. It is logical that we should now introduce legislation specifically designed to integrate the atomic energy industry into our national economy.

Although the necessity for such legislation has been realized in many quarters for some time, so far there has been made no public presentation of specific alternate legislation. To meet this need, we are advancing for consideration by the readers of this journal, as a basis for discussion, tentative proposals for new domestic atomic energy legislation. This does not necessarily represent the final policy of *Nucleonics*, but it is our hope that the ensuing discussion will result in the enactment of a workable, legal framework which will be acceptable to the Congress, the scientists, the military, industry, and the public at large.

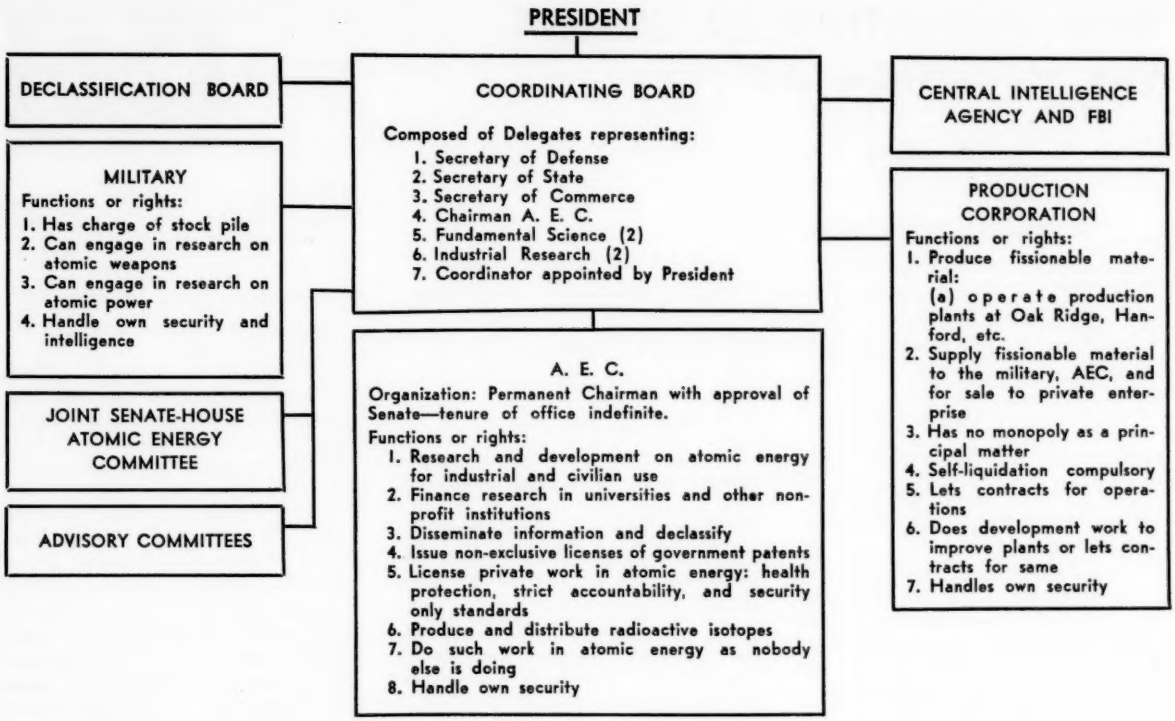
The organization chart shown on page 278 provides an overall picture of the structure of this proposed legislation. Its exposition will be aided by reference to this diagram.

Philosophy and Functions of the Coordinating Board

We first established a coordinating board which shall have the duty of regulating the distribution of fissionable material production. This will be composed of a coordinator appointed by the President, who will act as chairman of a board of delegates representing the Secretary of Defense, Secretary of State, Secretary of Commerce, the Chairman of the AEC, and four citizens representing fundamental science and industrial research. Two of the four people representing science and industry might well be the coordinator of the Research and Development Board and the chairman of the National Science Foundation if the latter should be set up. This Coordinating Board will coordinate the activities of the three independent groups of fissionable material users indicated in the accompanying organization chart.

The AEC and Production Corporation will submit annual budgets through the Coordinating Board for inclusion in the President's annual budget message to Congress. This will give both the President and Congress the opportunity to make an annual review of the programs and plans of the two agencies. All income from sale of atomic production and facilities will be deposited in the general fund of the U. S. treasury and will not be available for spending by the AEC or Production Corporation without specific authorization by Congress.

The coordinating board simplifies the administrative functions by separating the responsibilities for research, production and military development into three separate administrative organs. At the same time the all important policy making decisions become the function of a board with no administrative responsibilities. As befitting the importance of


PRESIDENT
DECLASSIFICATION BOARD
COORDINATING BOARD
Composed of Delegates representing:
1. Secretary of Defense
2. Secretary of State
3. Secretary of Commerce
4. Chairman A. E. C.
5. Fundamental Science (2)
6. Industrial Research (2)
7. Coordinator appointed by President
CENTRAL INTELLIGENCE AGENCY AND FBI
MILITARY
Functions or rights:
1. Has charge of stock pile
2. Can engage in research on atomic weapons
3. Can engage in research on atomic power
4. Handle own security and intelligence
PRODUCTION CORPORATION
Functions or rights:
1. Produce fissionable material:
(a) operate production plants at Oak Ridge, Hanford, etc.
2. Supply fissionable material to the military, AEC, and for sale to private enterprise
3. Has no monopoly as a principal matter
4. Self-liquidation compulsory
5. Lets contracts for operations
6. Does development work to improve plants or lets contracts for same
7. Handles own security
JOINT SENATE-HOUSE ATOMIC ENERGY COMMITTEE
ADVISORY COMMITTEES
A. E. C.
Organization: Permanent Chairman with approval of Senate—tenure of office indefinite.
Functions or rights:
1. Research and development on atomic energy for industrial and civilian use
2. Finance research in universities and other non-profit institutions
3. Disseminate information and declassify
4. Issue non-exclusive licenses of government patents
5. License private work in atomic energy: health protection, strict accountability, and security only standards
6. Produce and distribute radioactive isotopes
7. Do such work in atomic energy as nobody else is doing
8. Handle own security

their decisions, this board has cabinet rank. This is in accordance with the fundamental principle of our constitution, which makes such decisions the province of the cabinet, which is responsible politically to the executive, and removable if the policies are not publicly acceptable. The continuity of the work is assured by having an administration which is thus insulated from changes in policy or in party politics. Since the coordinating board will not sit permanently, the services of the best men in the country can be obtained.

Function of the Production Corporation

The Production Corporation will be a government corporation for manufacturing fissionable material. It will have the responsibility of running the present producing plants of the government at Oak Ridge and Hanford. This Corporation will have the power to lease or give contracts for operation of its facilities and also the right, with the approval of the Coordinating Board, of disposing of these plants by sale. It can do development work to improve its plants, or it can let contracts for this purpose.

The Production Corporation will supply fissionable material, with the approval of the Coordinating Board, to the military establishments, to the AEC, and to private enterprises. The production of fissionable material by private firms during their operation of nuclear reactors does not come under the province of this corporation. The Production Corporation will be responsible for its own information and physical security, although it will be coordinated with other security systems as explained later.

Function of The Military

As indicated by the accompanying organization chart, and the functions of the Production Corporation, the Army, Navy, and Air Force are given explicit rights to engage in research on atomic weapons and atomic power using fissionable material produced by the Production Corporation. The military is also given explicit rights to accumulate stock piles of atomic weapons according to its needs, as approved by the Coordinating Board. The military will be responsible for its own information and physical security, although it will be coordinated with others as explained later.

Since the military applications of atomic energy are for the time being of paramount importance to the defense of the American people, and since pre-eminence in this field is vital to our national existence, we have sought to include in the legislation provision for the widest participation of all qualified groups. Development of atomic weapons and atomic machines may well be decisive in another war and therefore this is a responsibility of the military as well as the scientists. While we agree that science cannot flourish under military domination, we do not feel that the military arts should be subordinated to the leadership of the natural scientists.

Functions of the Atomic Energy Commission

The function of the Atomic Energy Commission will be explicitly to carry on research and development of atomic energy for its application to civilian and industrial uses, to produce and distribute radioisotopes, to finance research on basic science, in universities and other non-profit organizations and to conduct research on all phases of atomic energy including production of fissionable material and atomic weapons. It would

have charge of its own security, and cooperate with the security organizations independently responsible for the information security of the military, the Production Corporation, and private firms, for the purpose of formulating uniform secrecy policies. The Commission would then have charge of the public dissemination of technical information consistent with security.

The Atomic Energy Commission would have the right to give non-exclusive license of government patents in atomic energy, and to authorize work in atomic energy by private individuals and corporations. The only standards governing the licensing of work in nuclear energy would be standards of health protection, accountability, and security. The Commission would have the duty to see that strict account is taken of fissionable materials used by private parties and that work done on atomic energy is consistent with public health and national security. The Commission has the primary responsibility of seeing that work in atomic energy is consistent with national security, and in administering security, clearance problems, export regulations, and other general regulations.

The Commission should continue its present function of producing radioisotopes and financing the early development of nuclear reactors.

In the absence of a National Science Foundation, it should continue to support fundamental research in physics, chemistry, and the life sciences, although logically of course, this should not be its province.

Since the performance of the functions here outlined for the AEC make possible a great reduction in the powers delegated to the Commission by Congress, there seems no objection to having a permanent commissioner. We would therefore have all the commissioners appointed in the same fashion as the department heads of the Bureau of Standards, with the approval of the Senate and with tenure indefinite.

Advisory Committees; Functions of Security and Intelligence

The Joint Senate-House Committee on atomic energy would be continued. The Coordinating Board may also want to appoint such advisory committees as it should deem necessary.

The three main operating elements, the military, the Production Corporation and the AEC will operate under substantially the same security regulations as are now enforced. The Federal Bureau of Investigation will continue to be responsible for the investigation of individuals presented for clearance. Obviously, the military is capable of handling its own security and intelligence. (It might be expedient for the AEC and Production Corporation to have a single security unit, instead of separate units as indicated. This is a question of convenience of administration.) Security for private industrial organizations will be the responsibility of the AEC security unit.

At the present time, private contractors are performing the most important functions of the Atomic Energy Commission, and there is no reason to believe that under a different legal set-up, the same organizations will be less scrupulous about following security regulations. Everybody realizes that the main security of the United States rests not on keeping secrets, necessary and important as this is, but even more on outstripping all other nations in the development of atomic energy on all levels, scientific, industrial and military. This is the main advantage to security which this proposed legislation offers.

Provision for special security problems which are peculiar to atomic energy and not common to the other military developments, such as export regulations for uranium and other fissionable materials, and the dissemination of information, should be explicitly made in this bill.

Patent Provisions of New Legislation

Although many proposals and counter-proposals for the weakening or strengthening of the United States Patent System have been advocated, we do not feel that a revision of the present patent laws should be attempted in nuclear energy legislation. If it can be demonstrated that the present patent laws do not give sufficient protection to the interests of the American people, or sufficient stimulation to the development of inventions, new patent laws should be enacted by Congress. All the McMahon Act patent provisions will, therefore, simply be eliminated in this legislation.

Similarly, the anti-trust laws entered in the statute books effectively prevent monopoly in any field, and if in future circumstances they do not, the place to alter them is in a special antitrust law, and not in nuclear energy legislation. Therefore, we do not give the AEC any special discretionary powers for giving or withholding patent licenses on interpretation of possible monopoly formations.

Keeping patent applications secret is a problem which atomic energy shares with many other military developments such as biological warfare and guided missiles, and a uniform procedure should be followed.

Since this is a new field, fears have been expressed that patents of such broad generalities can be obtained as to stifle effectively further development. If this fear can be justified, and we do not believe that it can be, the remedy would be to provide that holders of patents of broad application should be required to grant non-exclusive licenses on a royalty basis. Patents of narrow applicability should remain valid as usual and as in any other field.

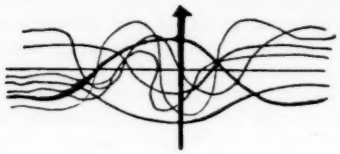
Compensation to the government for the use of its fissionable material should be in the form of a reasonable rental. In research and development under government contracts, the use of fissionable material should accordingly be treated as a government contribution and this should be taken into consideration in determining patent rights in government-sponsored research. These patent rights should depend on the various contributions; depending upon the kind of "know-how" contributed by industry, and the share of the cost borne by the government.

General Principles of Legislation Summarized

All subjects which are not covered by explicit clauses in the preceding provisions are understood to function normally. For example: Mining and purchase of land containing source materials should proceed as for all other raw materials. This, and all other non-government contributions to the development of nuclear energy, should be allowed freely, provided provisions for strict ac-

(Continued on page 288)

SHALL THE ATOMIC ENERGY ACT BE REVISED?



Edward Levi

Dr. Levi gives here a critique of the revision of the McMahon Act suggested by the editorial reprinted on page 277 from the McGraw-Hill journal NUCLEONICS. Dr. Levi is Professor of Law at the University of Chicago.

Several suggestions for changes in the Atomic Energy Act of 1946 have appeared. Very few arguments are advanced for such changes. One principal and to me unconvincing argument is the failure to reach agreement with the Russians. I cannot help feeling that this failure is the *pretext* for the suggested changes and is not really advanced as a *reason* for them. For the failure to reach an international agreement does not at this juncture make an international agreement less imperative. It would appear that we stand in as great need of such an agreement today as when the Act was passed. It hardly seems wise to take a step today which will make such an agreement more difficult to reach.

One could argue that in the absence of such an agreement this country will have to proceed realistically. Surely this is so. But the tense international atmosphere, the greater need for secrecy which result from the failure to have an agreement, do not suggest that now is the time to turn over to private industry a development which has so much military significance and to which so much governmental policy must be linked. For example, the failure to reach agreement would appear to make it more important that the government control deposits and research, or be able to do its own research. It would appear to make it more important that the military policy be tied in to the governmental structure.

And as for the proposed change in the patent structure, as long as the international situation remains so tense, there is even less opportunity for the normal patent system to operate; more secrets must be maintained; less public information can be given.

It is undoubtedly unfair to say the critics of the Act sigh with relief now that no international agreement has been reached and seem to be over anxious to now suggest steps which will make an international agreement more difficult. Yet surely one ought to think twice before advocating steps which (1) will make an international agreement the more difficult and (2) do not seem justifiable on any basis of strengthening national developments at the present time.

It is difficult to comment on the proposed revisions because they are really not frankly and explicitly stated, as for example, in the DeCew article, but appear frequently by indirection. For example, one of the main purposes of the suggested revision, I believe, is to modify the patent system provided for under the present act. That the new act hinted at in the DeCew article will do this appears clearly enough, but that this is one of the primary purposes of the new act is not stated. It is not clear to me, to take another example, how much production of fissionable material is to be permitted private companies under the proposed act. I suspect that a considerable amount will be permitted.

It is difficult to comment on the proposals without knowing answers to certain key questions about the workings of the present act, under its present administration. For example, how is research progressing? The proposed revision apparently attempts to give the priority in all cases to private research and would not permit the commission to undertake research in fields covered elsewhere. What about military research? The proposed bill apparently attempts to turn that over to the military and I would think exclusively. What about the working and discovery of uranium deposits under the present law? Is there any reason to suppose that the failure to permit complete private ownership has retarded development in this field?

Still, some remarks can be made about the proposed revision. It apparently attempts to do the following:

1. Provide for a much weakened top policy group, including part-time people, which will mean that the day-to-day decisions cannot be made by it. This is a return to the original atomic energy commission proposal (May-Johnson bill) which was fought by the scientists. I do not think it means much to say that this new commission will have cabinet status. It will be a somewhat weak group with big names, meeting occasionally, and this will strengthen the hand of private groups.

2. Change the patent policy of the present Act in order to permit private ownership of patents central to the atomic energy field. I see nothing to justify this change at the present time. The patent system has its justification as a system of unusual rewards—monopoly privileges of a limited nature—for unusual work by private industry. The *quid pro quo* for the limited monopoly privilege is the making available of new processes and developments. In the atomic energy field such new processes and developments must at present be covered over by secrecy requirements and therefore one of the purposes of the patent laws—to make things generally available to the public so far

(Continued on page 285)

SOME INDIVIDUAL CASES OF CLEARANCE PROCEDURES

Committee on Secrecy and Clearance,
Federation of American Scientists

This report illustrates in greater detail some of the findings of a survey on clearance procedures reported by the Federation's Committee on Secrecy and Clearance in the April and June issues of the BULLETIN. Members of the Committee are: S. H. Bauer, Chairman, H. A. Bethe, L. M. Brown, P. J. W. Debye, G. K. Fraenkel, A. R. Moore, P. Morrison, R. S. Rochlin, R R. Wilson.

In previous articles,[7,8] this Committee has reported the results of a questionnaire survey designed to obtain information on loyalty clearance procedures affecting scientists. These questionnaires were sent to the directors of representative government and non-government laboratories. We have, in addition, received many reports from individuals giving accounts of their personal experience with these procedures, and it is a sample of these reports which we present here.

This Committee mailed in November, 1947, a general request to members of the Federation of American Scientists to inform us of any cases known to them of allegedly unfair clearance procedures. In this manner we learned of 76 cases, of which 56 involve scientists.

In general, it is difficult to obtain such information. If an individual is denied clearance, he hesitates to inform even his friends because of the implied reflection on his character, however unwarranted the clearance denial may be. Therefore, the response to our request probably represents a small fraction of the total number of cases.

In view of the widespread interest in clearance problems, this Committee has felt it desirable to make public a selected number of these individual cases in detail. We have, of course, no way of checking the veracity of each letter sent to us. We can state only that, in each case described below, the facts are taken directly from a letter in our files, signed by the individual concerned, and that specific permission to publish this information was obtained from each individual. For obvious reasons we have eliminated any details which would identify these persons.

The Case of Dr. A.

Dr. A was offered a post as Physiologist P-6 in an Army laboratory. He was informed that he had been cleared by Military Intelligence. Turning down other offers, he moved to the east coast from California, where he had been living for twenty years, to assume his duties. Prior to this, he had had fifteen years of research experience at universities.

Dr. A reports in a letter to this Committee:

". . . Two months after I arrived here I was abruptly informed that the clearance I had received was only an interim one and that I was not cleared. I was offered the alternative of resigning 'without prejudice' or of being suspended. I was curtly informed an appeal would be fruitless and if suspended I would be ultimately dismissed 'with cause' and it would be so entered into my record. That evening, at the quarters of a representative of the Military Intelligence, where I demanded to know the reasons, I was told that there were no charges against me but that Military Intelligence considered me a potential "risk" for the following reasons:

1) The birthplace of my parents.
2) I was a member of the Federation of Atomic Scientists.
3) I was a member of the Independent Citizens Committee of the Arts, Sciences and Professions.
4) I knew too many left wing people like the late - - - .

All the above information was, of course, incorporated in the PSQ form on which I had been given my original clearance. On the basis of the above, I was considered to be either a Communist or a 'fellow-traveller'.

"For your information, I am a Democrat, considered liberal by those who know me. I am not now, nor ever have been, a Communist or 'fellow-traveller' (whatever the latter means). Futhermore, I view with equal repugnance dictatorships of either the left or the right. In addition to a good academic research reputation I have a 4-1/2 year record of accomplishment as Responsible Investigator for OSRD-cmr and BuMed and Surgery projects. These were carried on during the war while I was at - - -, and were highly classified."

Dr. A decided against resigning and so was suspended "in the interests of national security" without a hearing. Five months later, the Secretary of the Army ordered his reinstatement and stated that the "action taken was unjustified". He received his back pay and an apology. He then resigned to accept a better position.

The Case of Drs. B.

Drs. B, husband and wife, had worked for a large electrical company as physicists, for five and ten years respectively. In October, 1946, they were persuaded to accept positions doing non-secret work at the Brookhaven Laboratory of the Atomic Energy Commission and made arrangements to leave:

"We purchased a house . . . and in January, 1947, we moved . . . to

Long Island. On our moving day we heard for the first time that our clearances were being held up. We were given no reason and could think of none. Dr. - - - was sure that the matter would be cleared up shortly although he wrote us saying that he could not make any commitment concerning our possible connection with Brookhaven later. In our conversation he requested us to refrain from any discussion of our case since he felt that publicity might be prejudicial to us. We could see that it would be undesirable from the Laboratory's viewpoint and we agreed to this procedure.

"We then entered upon a period of uncertainty and virtual isolation which was to last until the middle of August, although periodic calls to Dr. - - and other Brookhaven personnel ellicited assurances that the matter would be settled in a week or two. Early in March we were visited by two representatives of the FBI who questioned us for an hour or so. Some of their questions concerned a college friend whom we had not seen for six years, and who was arrested during the Canadian spy scare. We attributed our difficulties to this connection for two days, but then our friend was acquitted, completely exonerated, and reinstated in his job at Queen's University. This apparently had no effect on our case. The FBI were also interested in our acquaintances among the UERMWA, the union under which the - - workers were organized. They probed into our opinions and activities during the - - strike and questioned us regarding our opinions of communism, international control of atomic energy and the appropriate treatment for spies and saboteurs. In spite of the unpleasant implications of such questions we tried to cooperate as thoroughly as possible and to make it obvious that no reason existed for questioning our loyalty and integrity.

"Nothing further happened until July 9th when we were invited at 7 a.m. to go to Washington that same day at our own expense for a 'hearing'. One of us flew to Washington where he was questioned by a three man group which was willing to identify itself to us only to the extent of stating it was not part of the AEC organization. The hearing covered exactly the same ground as had been covered four months before by the FBI.

"This expedition also produced no visible results. By this time even Dr. - - agreed that no further purpose was to be served by reticence and we brought our situation to the attention of the Federation of American Scientists. The Federation wrote to the AEC early in August in our behalf making a strong request that our case be decided one way or the other. Perhaps as a result of this letter, or possibly by coincidence, we were granted provisional clearances on August 14th and shortly after, started work at Brookhaven.

"We still have had no explanation of the delay. We are still working under provisional clearances. And we have had no compensation for the half-year period when we were without income."

The Case of Dr. C.

Dr. C is a biologist of 19 years experience who has published more than 60 papers. In 1946, he was made chief of a section at a U. S. Army research laboratory. This position terminated without notice or explanation after he had been there for several months. He gives his story as follows:

". . . Colonel X, the director of the Y laboratory, called me into his office, closed the doors, brought in Lt. Col. - - - as a witness, and told me he had received an order from the Commanding General of Y to terminate my services, because I could not be cleared for access to classified documents. I explained that I had already been cleared during the war, had read numerous secret documents in the course of my work, and was myself author of a number of classified publications, and the holder of patents pending with the Army and Navy, likewise classified. Col. X then said that if I resigned straightaway, nothing further would be said about the matter. I replied at once that I would do nothing of the sort, as it would be tantamount to an admission of guilt concerning charges of which he refused to apprise me, and of which I was ignorant (and still am).

"I made preparations for leaving early the following morning to look for a job in Washington, and returned late the following night to my quarters in one of the officers' barracks....[The next day] a GI entered my bedroom at 6:20 a.m. without knocking and ordered me to report to the kitchen. He returned a short time later, and said he had orders personally to conduct me there, and that a civilian on a military reservation had no civil rights, but was subject to military discretion. By this time I was fully roused and half dressed, and telephoned the officer in charge at the mess to inquire what he wanted. He said that he had been looking for me all the previous day, and ordered me to vacate my room at once. I explained that in the course of two months I had brought many of my personal effects, books, and some paintings, and it would take some time to pack them. He replied that if I did not follow his orders, he would send over some soldiers, and throw the stuff out.

"With the aid of a number of friends, and a borrowed car, I managed to collect cartons, and pack my things. . . . At lunch time I ran into Col. X who was accompanying a civilian who was considering a job at Y. The latter asked me how things were. I felt obliged to tell him frankly what had transpired and in the presence of Col. X, who did not contradict a single word. In the presence of this person Col. X also suggested that I explain to anyone inquiring why I had left Y, that I had done so because I did not like the place. I replied that I would tell no such untruth to anyone."

Dr. C then spent several weeks trying vainly at various places, including the Pentagon building and the Civil Service Commission, to ascertain the charges presented against him.

". . . At G-2 HQ (military intelligence) in - - -, I had rather a unique interview with Col. - - -, who refused to tell me what charges were preferred against me (even though as I subsequently learned this is required in the Civilian Personnel Regulations), denied some of the basic principles of civil service, and blew up because I recorded his statements in a notebook. I even showed him what I had written.

"I might state here that I have never been a member of the Communist Party, and know practically nothing of their activities. . . . Why I was denied clearance at Y, after having [previously] been cleared at the - - - laboratory, I have been unable to ascertain. Both my parents were born in Kovno, Lithuania (for-

merly Kovno, Russia). I subscribe to PM, In Fact, The New Republic, Consumers' Union, and receive about a dozen scientific publications. After the war I received a letter of commendation from the group leader and a certificate of effective service from the OSRD."

After five months of unemployment, Dr. C secured another position doing unclassified work. In spite of the fact that he was not able to learn the charges against him, much less contest them, he is apparently not to be given the chance to be judged on his merits in his new job.

". . . After having been at the Z laboratory about six months, I was informed only recently that the Army's Central Intelligence Bureau, unsolicited, sent representatives to the Assistant Director of Z, and to the chief of the laboratory I have been working in, to make representations concerning me. It appears that the Army proposes to 'hound' me out of any position I may succeed in obtaining. There is no question that the Y dismissal has made it difficult for me to obtain another job as my subsequent attempts demonstrated. This is true despite the fact that the Report of the President's Scientific Research Board . . . bewails at great length the shortage of adequately trained and experienced personnel to attack the nation's urgent health problems. . . . It may be appropriate to point out at this juncture that these health problems are as yet unclassified projects."

The Case of Dr. D.

Dr. D, a young physicist, had recently received his Ph.D. and had been employed in the Research Laboratory of the - - - Company at the time he was refused clearance. So sure was he that a mistake had been made in his case, and so important to his future did he consider this action, that he spent a year and a half trying to obtain a statement of charges and a hearing, first from the Manhattan District and then from the Atomic Energy Commission. He did not succeed, however, and in a recent letter to this Committee, he wrote:

"Frankly, I'm quite discouraged and am ready to give up. I'm looking for a university position now . . . I hope I never hear the word clearance again. This is probably running away from my problem, but I've wasted enough time here, and I've got to get out and do some physics."

Some of his experiences in trying to find out the reasons why he was not cleared may be of interest:

"On October 14 I spoke to Lt. - - -, officer in the Area Engineer's Office here in charge of clearance. He told me some things that were *not* responsible for my not being cleared, and then lectured briefly on the evils of organization in reference to an organization I had belonged to in - - -. However, he would not commit himself to the statement that this was the reason for refusing my clearance. In fact, he said that there was 'something' further about the case that he would like to tell me—'for your own good'—but that he could not for security reasons. He said that my record indicated no reason to doubt my personal loyalty. In answer to my query as to what I could do, since I did not feel satisfied, he suggested that I ask the - - - Co. to request a review of the case."

This request was made, and clearance was again refused. The organization mentioned above, membership in which was the only specific item mentioned by any official in a year and a half of searching by Dr. D, was described by him as follows:

"[It was] a group whose purpose was to work for equality of opportunity for all people, regardless of race or color. . . . The objectives of the organization, . . . were in accord with those of churches and other humanitarian organizations with whom they cooperated. . . . Typical examples of things we did are: . . . participated actively in campaigns to try to obtain Fair Employment Practices legislation; visited the mayor of - - - to urge him to act to stop an upsurge of racial prejudice and discrimination in the city, and made concrete suggestions for a city-wide educational program on racial tolerance; drew up definite plans for public housing programs for low income groups, into which class most of the people of the organization fell; spoke to managers of establishments known to discriminate against Negroes, and tried to convince them that such action was morally wrong and in violation of existing . . . state laws . . . ."

In addition to the above, Dr. D points out in considerable detail that while he was a member he never had any reason to suspect that any members of this organization were Communists, and that ever since nine months before applying for clearance he has had no relations with this group or its members.

The Case of Mr. E.

The author of the following letter was refused clearance and dismissed from the research laboratory of a prominent electrical manufacturing company. He writes:

"A year ago [December, 1946] I was summoned to the office of Dr. - - -, Head of the Laboratory, and was abruptly told to submit my resignation because I had not been cleared by the Army for - - - work. This came as a complete shock as I had been employed by the Laboratory for seven and a half years, including the war years when I had been covered by Security Clearance. For these reasons, I was referred to the V Laboratories security officer who told me nothing but suggested 'that they knew who my friends were'. This may have referred to my personal or my social friends; I do not know. No appeal was possible. I was subsequently informed that the one month period initially given me 'to get out' was modified to cover such time, up to several months, as was necessary for me to find employment elsewhere. Dr. - - and other laboratory managerial personnel had meanwhile received the protests of other members of the laboratory who either felt there had been no previous understanding that failure to receive clearance would result in dismissal or who felt that I had been treated too harshly. In no manner, to repeat, was I given either the opportunity to appeal my case or to learn any more definitely the reasons for my failure to receive clearance.

"To make matters worse, the V Co. was able to use me on non-secret work at their J Laboratory, for I was asked to make a visit there for an interview. This interview, however, was cancelled by the J people after 'checking with the Research Lab in - - -'. Similarly while I was visiting [a separate industrial firm] where clearance was no issue, my in-

terview was abruptly terminated—they informed me they had 'checked with the V Research Laboratory in - - -'."

The Case of Dr. F.

Dr. F is a physicist and mechanical engineer who had worked for a number of years in the aircraft industry. In his case failure to obtain clearance has had rather drastic effects. He states that inasmuch as practically all work being done in aircraft research is being financed by the armed services, his clearance difficulties practically eliminate this field of employment for him.

During the war, Dr. F had been cleared by Navy Intelligence, Army Intelligence, and by the FBI (for OSRD). After the war, he was employed by a large aircraft company on an Army Air Force project. Application was made for clearance early in 1946. Dr. F was transferred to other work of a non-secret nature and when this was completed he was given a leave of absence without pay. Later he received a letter from the company which said in part:

"Notice was received by us in January, 1947, that your services could not be used on classified projects, pending complete investigation. Following receipt of this notice, we . . . assigned you to unclassified work. When the unclassified work available was completed, and your clearance had still not been received, there was no alternative but to terminate your employment.

"Your work had been satisfactory, and inasmuch as a large amount of classified work for which you were qualified has continually existed since your termination, it is probable that your employment by us would have continued, provided that your clearance for access to classified information had been received."

In Dr. F's letter to this Committee he states:

"The 'complete investigation' is presumably still going on [March, 1948]. I am on leave of absence without pay; I am neither cleared nor uncleared.

"Mr. - - -, the local AAF leg man in such matters, tells me that there are cases in which this indeterminate condition has existed for 18 months and is still going strong. My offer to aid in the investigation was declined. I voluntarily wrote a long letter giving my views and personal history in practically every category which I thought might have bearing. . . . I have been unable to find the reason for the delay or the nature of the difficulty. . . . I do not know of any action which I can take which will stimulate a decision. . . .

"I applied for a job requiring Navy clearance. The same day the local office of Naval Intelligence was able to inform my prospective employer that, '. . . they also would not be able to clear you for confidential work.' Again no hint as to the reasons, no effective method of review.

"I have discussed employment with the head of the Mechanical Engineering Department of - - - University I learned that approximately 99% of the funds currently being spent on research are supplied by the Navy and that again the Navy clearance is required of all university employees who participate in the spending of this money. Needless to say, my probable difficulty in obtaining this clearance did not enhance my value as a prospective employee."

In the letter mentioned above, which was addressed to the general in command of the AAF project for which clearance was refused, Dr. F states, in part:

"As opposed to any existing or proposed alternative forms of government, I much prefer our own. I have repeatedly defended its virtues in arguments with people who advocate other systems. By and large, I subscribe to the editorial policies expressed in the Wall Street Journal, Fortune, and Time Magazine. I have been a subscriber and reader of all of these publications for several years. . . .

"I view with great apprehension the rising tide of Communism throughout the world. I favor all measures, including a vigorous military research and development program which will strengthen us and our government."

The Case of Mr. G.

Mr. G is a chemist who has traversed a complex path of clearances and denial of clearance for a period of two years. For four years previous to the events described below, he had worked on various classified projects including three years during the war with the Manhattan District. During this time, his clearance status was not questioned.

Early in 1946, he was asked to join a group urgently needed at Los Alamos to work on the Bikini atomic bomb tests. Mr. G made immediate plans for leaving, but the day before his planned departure, a telephone message was received stating that he had not been cleared. He writes:

"This came as a shock to my wife and me. . . . I knew of absolutely no reason why I should not be cleared. I have never belonged to any subversive organizations nor taken part in any subversive activities, nor has my wife. . . . The denial of clearance resulted in a series of indignation meetings among my associates. . . . Dr. - - - who had gone on to Los Alamos, had been told that my case had gone up to the highest authorities, who had personally refused my clearance. Accordingly, on February 21, I sent a telegram to General Leslie R. Groves asking either that I be cleared or be told the reason why clearance was refused. . . . On February 26, I received a reply from General Groves: 'APPARENTLY THERE HAS BEEN SOME MISUNDERSTANDING CONCERNING YOUR CLEARANCE STATUS PD I HAVE CHECKED INTO THIS MATTER AND FIND THAT YOU HAVE BEEN CLEARED FOR EMPLOYMENT AT LOS ALAMOS PD END MAJ. GEN. L. R. GROVES MANHATTAN DIST. WASHINGTON, D. C.'"

Upon arrival at Los Alamos, Mr. G was told to make preparations for going overseas, which he did. Three days before the party left, however, the laboratory director told Mr. G that he was unwilling to request the additional clearance needed for leaving the country as he anticipated trouble in obtaining it. A few days later the same official told Mr. G that there was not the slightest doubt but that he would have been cleared to go overseas, but that he was needed to take charge of - - - at Los Alamos.

When Mr. G returned from Los Alamos he inquired about the possibility of becoming a consultant-without-pay to the AEC laboratory at which he had been employed during the war. He writes:

". . . Reasons for doing so were: 1) I had been assured that provided

the work was of the proper quality, I could use as thesis material for a Ph.D. degree some of the work I had done for the - - - Laboratory; and 2) some members of the Laboratory staff were interested in having me available as a consultant on those problems with which I had been directly connected. . . . Again, it was necessary that I be cleared."

Mr. G waited for three months and was then told he could not be cleared. In February, 1947, he wrote a long letter appealing his case directly to the Atomic Energy Commission. Twelve months later he was granted partial clearance for "access to files" to complete his thesis. He has not yet been told whether he can be employed again at an AEC laboratory. In his letter to the AEC, Mr. G wrote, in part:

"The clearance difficulties in which [I] have been involved raise a number of questions which seem to lead to inconsistencies. The telegram which I received from General Groves states that 'apparently there has been some misunderstanding concerning your clearance status.' But if the denial of clearance was really the result of a misunderstanding, why should there have been any question concerning my clearance to go overseas [or to work at the] - - - Laboratory? . . .

"The personal results of [my] security difficulties have been many. [I] have suffered financial loss, personal discomfort, and great personal embarrassment. . . . The implications, moreover, are far-reaching in their effect and can quite conceivably prejudice one's status for many years. . . . Since first being employed by the Manhattan District, I have planned to make this field my life work and to go back to work in one of the National Laboratories concerned with atomic energy when I have obtained my Ph.D. degree. Now, unless a change in decision is made, this is no longer possible. . . .

"However, the broader implications of the denial of clearance are, of course, the more important, far-reaching ones. The fact that a man can be judged without knowing what is held against him and without having a chance to clarify his position is intolerable. A security system based upon such false premises seems entirely incompatible with a democracy. It is only reasonable and just that one should know the facts in his own case and have an opportunity to speak in his own behalf. I should welcome an opportunity to do so."

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SHALL THE ATOMIC ENERGY ACT BE REVISED?

(Continued from page 280)

as information is concerned—cannot be served. The other purpose of stimulating invention is much cut down in this field where direct governmental assistance through grants and contracts must be provided. Finally the monopoly privilege itself, as the framers of the editorial admit, cannot be maintained completely in this field. Therefore it seems that a modification of the usual patent system is in order for this field; that is what the present Act provides.

3. The projected Bill attempts to restore to private industry completely many functions, as for example, mining and purchase of land containing source materials. No indication is given as to why the present provisions are not satisfactory. But in general the attempt seems to be to make it possible for private firms to increase their stake in the development of source materials.

4. As indicated above, private industry is to be given priority on the research which it wishes to undertake, without competition from the government agencies. Of course it is not correct to say that private industry will then be doing such research *unaided* by government, for the clear intention is that the government must stand ready to subsidize such research. Governmental aid is not to be cut down, but the fruits of such aid are to go more to private industry.

This much can be said at present. Yet the central question probably is: Are those who suggest amendments of the Act right in their implicit assumptions that research and development do not progress under the present set-up as rapidly and successfully as they could under changed provisions? Here is a question on which informed scientists should speak up. No one else can speak up for them.

UNITED NATIONS ATOMIC ENERGY NEWS

Peter Kihss

Mr. Kihss, the representative of the NEW YORK HERALD TRIBUNE at Lake Success, reports negotiations on atomic energy control for the BULLETIN.

The United Nations launched an international atomic bibliography during July, gave a preview of probable mass support from non-Slav nations in the General Assembly for excluding the great-power veto in atomic affairs and set establishment of atomic controls as a basic condition for non-atomic disarmament.

July 1: With the atomic control deadlock due to be placed before the General Assembly this fall, Frederick Osborn, deputy American delegate to the Atomic Energy Commission, told the Wellesley Conference, Wellesley, Mass., that there was "a great struggle now going on between the self-governing peoples of the world and the Soviet dictatorship." He called for strength and firmness "if we are to win this struggle without being forced into a war."

The majority atomic plan, he conceded, would require the Soviet Union to give up some of its secrecy, but "in return for this increasing openness, this increasing participation in the world community, it would get step by step an increasing security." In contrast, he said, "the Soviet counter-proposals seem to the majority pure hypocrisy, an attempt to mislead public opinion rather than reach a solution."

General Osborn said the majority has come to "believe that for the present at least the Soviet Union would rather run the risk of leaving a preponderant strength in this weapon in the hands of others rather than risk opening up the Soviet Union to the extent required by any real system of international control. . . . If the majority delegates are correct in their appraisal, we are forced to the conclusion that there is no likelihood of agreement on effective international control of atomic energy until there are very basic changes in the point of view of the Soviet rulers."

July 9: The Soviet-boycotted Little Assembly, properly the interim committee of the General Assembly, completed recommendations for its parent body on ways to limit great-power veto use in the Security Council. One recommendation, unanimously adopted by the forty-odd countries taking part, would bear on excising vetoes from such things as enforcing atomic controls. This was a proposal "that the General Assembly recommend to the members of the United Nations that in agreements conferring functions on the Security Council, such conditions of voting within this body be provided as would exclude the application of the rule of unanimity of the permanent members."

Sponsoring this, Joseph Nisot, of Belgium, pointed out that even the League of Nations Council—theoretically requiring unanimity of all members on important issues—was authorized by special agreements to take substantive decisions by majority or two-thirds votes. Majority votes of the League Council were thus authorized, Mr. Nisot noted, in the Statute of the Memel Territory, the Lausanne peace treaty and more than fifteen international instruments for protection of minorities. Two-thirds votes were authorized by the Aaland Islands convention, the Locarno treaty of mutual guarantee, and the Straits of Dardanelles convention. Mr. Nisot noted that the Permanent Court of International Justice, in an advisory opinion in the Lausanne treaty, upheld the validity of special treaties conferring new obligations and powers on the Council.

In urging caution on veto-restraining efforts, Francois de Rose, of France, stressed the good faith of the four great powers participating in the Little Assembly work—France, Britain, China and the United States. These four, he said, had all approved the majority plan of the Atomic Energy Commission—"a major sacrifice of national sovereignty we might be called on to make to assure collective security. We want to be really freed from war and do not want to see a false security simply protected by fallacious measures."

July 14: Great Britain's annual report to the U.N. on fourteen non-self-governing territories revealed that Nyasaland now has a "Radioactive Minerals Ordinance." Sir Alan Burns, British delegate to the Trusteeship Council, told a reporter that a model ordinance had been circulated to all British territories for their adoption, as a precaution in case such minerals were discovered.

July 17: A two-volume international atomic bibliography was announced by the secretariat to provide background for Assembly delegates. The preliminary edition of Volume I, containing 587 listings, covered political, economic and social aspects. Volume II will deal with scientific aspects, and only a table of contents was issued at this time. The preliminary volumes were sent to all member governments, with a request that additions, corrections and comments for Volume I be submitted in time for a final edition September 30, and for Volume II in October. Librarians, research workers and scientists were also invited to help by communications addressed to the Atomic Energy Commission Group, Room A3-130, United Nations, Lake Success, N. Y. The bibliography was termed "selective, rather than exhaustive," with aims "to provide a wide range of subject matter and a broad international coverage; but the items included have been selected with a view to their quality and continuing value."

Volume I was divided into ten sections: I. International control; II. National control and development; III. Peaceful uses of atomic energy; IV. Military uses and defense measures; V. Social, economic, political and ethical implications; VI. Education and journalism; VII. Films, filmstrips, recordings, plays and radio scripts; VIII. General descriptions of atomic physics (less technical only); IX. List of bibliographies; X. List of journals.

The national section covered laws, regulations, decrees, judicial decisions, parliamentary debates and legislative documents of nineteen govern-

ments. It listed items from the control and development programs of Argentina, Australia, Canada, Chile, France, India, Mexico, New Zealand, Union of South Africa, Spain, Sweden, United Kingdom, United States and Venezuela; and the peace treaty prohibition on atomic work in Bulgaria, Finland, Hungary, Italy and Romania.

Admittedly this was incomplete, and there were still no government documents listed from the Soviet Union, Brazil, Cuba, Czechoslovakia, Denmark, Netherlands, Norway and Switzerland, all involved in various ways in atomic activities.

Soviet atomic interest was represented primarily by citations of political commentaries, plus four papers dealing with atomic physics in simple terms: "The atomic nucleus and its energy," by A. I. Alikhanov, from "Za Oborunu," of Moscow, January, 1946; "Atomic energy and the prospects of its utilization," by O. Pokrovskii, from the "Agitators' Notebook," of Moscow, 1946; "Atomic Energy," by E. Shpolsky, a 1946 book on scientific aspects and peaceful uses; and "Nuclear Energy," by Igor Tamm, an April 11, 1946 scientific article.

Volume II's proposed table of contents included: I. Fundamental science and technology; II. The physics and engineering of nuclear reactors; III. Biological effects of high energy radiation; IV. Medical applications of atomic energy; V. Use of radioactive tracers in science and technology.

An editorial note stressed the usefulness of this "as background material for political deliberations as well as for scientists throughout the world." The aim will be to include only literature since the discovery of nuclear fission in 1939, on the thesis that earlier nuclear science literature had been adequately summarized.

Also on July 17, Joseph E. Johnson, deputy American representative on the Little Assembly, spoke to the Mount Holyoke College Institute on the United Nations, at South Hadley, Mass., Mr. Johnson said that "in view of the Soviet position taken in July, 1946, and maintained without substantial modification ever since, the likelihood of establishing in the near future effective international control of atomic energy to insure its use for peaceful purposes only is very slight."

Fourteen of the seventeen nations which served on the U.N. commission, Mr. Johnson said, felt that "a control plan any less strong and complete than that developed by the majority of the commission would not promote international security but would on the contrary greatly enhance insecurity in the world. It is of the utmost importance that the American people keep this fact firmly in mind even in the face of prolonged failure to reach agreement. Here is one case in which half a loaf is infinitely worse than none."

July 24: President Truman transmitted the fourth semi-annual report of the United States Atomic Energy Commission to Congress. On the United Nations effort, he said "until controls are established on the international level to prevent the military use of atomic energy, we cannot, as a nation, afford to disclose these secrets which make this new force the most deadly form of military weapon." He said he had sought "through the United Nations to put the control of the dangerous aspects of atomic energy beyond the reach of any individual nation."

"When the nations of the world are prepared to join with us in the international control of atomic energy," the President went on, "this requirement of secrecy will disappear. Our government has sought, through its representatives on the United Nations Atomic Energy Commission, to find a common basis for understanding with the other member nations. However, the uncompromising refusal of the Soviet Union to participate in a workable control system has thus far obstructed progress."

July 25: The working committee of the Commission for Conventional Armaments, by nine votes to two (the Soviet Union and Ukraine), finally approved a six-point British resolution on general principles governing practical proposals for regulation and reduction of non-atomic armaments and armed forces, listing:

1. Adherence of all states, and initially "at least all states having substantial military resources."

2. An atmosphere of international confidence and security—"measures for the regulation and reduction of armaments which would follow the establishment of the necessary degree of confidence might in turn be expected to increase confidence and so justify further measures of regulation and reduction."

3. "Examples of conditions essential to such confidence and security" include, (a) establishment of the charter-proposed scheme of national forces earmarked for Security Council use in a threat to peace; (b) "The establishment of international control of atomic energy. It is a basic assumption of the work of the Commission for Conventional Armaments that the Atomic Energy Commission will make specific proposals for the elimination from national armaments of atomic weapons and other weapons of mass destruction"; and (c) conclusion of German and Japanese peace treaties.

4. Limitation of armaments and armed forces to those "consistent with and indispensable to the maintenance of international peace and security."

5. An adequate system of safeguards, including international supervision.

6. Provision for effective enforcement in case of violations.

Soviet Deputy Foreign Minister Yakov A. Malik submitted an alternative, which the committee shelved. The Soviet proposal included:

1. General regulation and reduction of armaments and armed forces should cover all countries and kinds.

2. It should provide reduction of armies, naval and air forces; limit combat characteristics of certain kinds of arms and prohibit others; reduce war budgets and arms production expenditures; and reduce war materials production.

3. It should "provide in the first place for the entire prohibition of production and use of atomic and other kinds of weapons designed for mass destruction and the destruction of stocks of such weapons which have been made."

4. It should establish a control system "within the framework of the Security Council."

The atomic problem came up during the World Health Assembly in Geneva. U.N. press reports of June 28 said Deputy Health Minister N. Baran, of the Soviet Union, denounced what he called stringent conditions incompatible with national sovereignty, assertedly attached to the use of United States radioisotopes. This situation, he said, contradicted principles in the World Health Organization constitution on promoting exchange of medical knowledge. Dr. Baran said the Ukraine is able to obtain radioisotopes, but smaller countries which cannot do so should be aided by the W.H.O. Dr. V. Bardos, of Czechoslovakia, recommended that the W.H.O. study medical uses of atomic energy.

PUBLIC ADMINISTRATION WITHOUT PUBLIC DEBATE

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Board of Review, June 20, 1947, and the Report of the Patent Advisory Panel, September 17, 1947. See Third Semi-Annual Report of the Commission op. cit. supra note 7, at 24-28 for a description of material.
d) Reports of Congressional Joint Committee on Atomic Energy, op. cit. supra note 12.

30. Public compliance with the Atomic Energy Act has been so effective that thus far there has been no test of the extremely difficult evidentiary questions which would arise in any prosecution for unlawful disclosure of secret information. See Haydock, Some Evidentiary Problems Posed by Atomic Energy Security Requirements, 61 Harv. L. Rev. 468 (1948); Secret Documents in Criminal Prosecutions, 47 Col. L. Rev. 1356 (1947). However, there have been a number of unreported convictions under Sections 47 and 128 of the Criminal Code (18 U. S. C. A. §§100, 234), including one in which such questions were involved. United States v. Paporello (D. C. N. M., 1948).
31. The Washington Post recently referred to "past military efforts to cover up mistakes under the guise of security and the tendency of some officers to classify virtually everything controversial as 'top secret'." Op. cit. supra note 18. It is certainly open to question whether the military is any more subject to this temptation than the civilian administrator.
32. Report of the Chairman of the American Society of Newspaper Editors Standing Committee On Atomic Energy, Editor and Publisher, 22 (April 24, 1948).

PRESIDENT TRUMAN UPHOLDS THE ATOMIC ENERGY ACT

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Secrecy is always distasteful to a free people. In scientific research, it is a handicap to productivity. But our need for security in an insecure world compels us, at the present time, to maintain a high order of secrecy in many of our atomic energy undertakings.

When the nations of the world are prepared to join with us in the international control of atomic energy, this requirement of secrecy will disappear. Our Government has sought, through its representatives on the United Nations Atomic Energy Commission, to find a common basis for understanding with the other member nations. However, the uncompromising refusal of the Soviet Union to participate in a workable control system has thus far obstructed progress.

The Atomic Energy Act has stood the test of two years of administration. There is no reason to question the sound basis on which it rests.

In two years, the world has found no ready answers to the problem of war and peace. Atomic energy, therefore, remains a fearful instrument of destruction and a wonderful invitation to progress through peace.

OUR CONTROL PLAN INSUFFICIENTLY KNOWN TO THE WORLD

(Continued from page 262)

As the United States led the world in marshaling its military forces for war, so the United States must lead the way in this mighty crusade for peace and disarmament.

I appreciate, as you do, the existence of the Iron Curtain and the inflexible will of the masters of the Kremlin. But that same human ingenuity, which found a way to split the atom, will find a way to split the Iron Curtain and shake the Kremlin's will if we mobilize the moral resources of mankind for that purpose.

No man, and no set of men, can stand out indefinitely against the united moral judgment of mankind. The yearning of the Russian people for peace and security is just as deep and just as sincere as our own.

Truth can penetrate the most unyielding barrier if we have the ardent purpose to make it do so. Against the magic power of radio, the Iron Curtain which stretches from the Baltic to the Balkans is no more effective than the Great Wall of China.

The alternative to universal disarmament is universal destruction—for ourselves as well as others. The system of private enterprise cannot stand up indefinitely under the intolerable strain of mounting military costs.

Long time preparation for atomic war eventually means government control of business to the point of strangulation. It means government direction of manpower, government intervention in all phases of social life, a dangerous growth of military influences in our domestic affairs, and a dangerous reliance upon the loyalty reports of police officers.

If the armaments race continues much longer, we shall be forced to remake the physical map of America. We shall have to install massive air raid shelters in large cities. We shall have to build a network of underground factories; we will need an enormous trained disaster corps to care for those who may be struck by sudden atomic attack; the federal agencies in Washington bunched together to form a perfect attack, will have to be relocated in the out-of-the-way places. These are some of the additional costs of the new type of warfare.

The United States faces the supreme challenge of its existence.

When the General Assembly of the United Nations meets next September in Paris, we must bring the issue of atomic control and universal disarmament to the judgment of humanity. We must keep this issue in the foreground until people everywhere understand the facts.

NEW LEGISLATION TO REPLACE THE McMAHON ACT

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countability to AEC and AEC rights of inspection for purposes of security are met. In all these instances the government rights stem from the need of strict accountability for materials, and not from any intrinsic rights of the government to monopolize production. Government expenditures for a certain development should be attuned to, and justified in terms of the non-existence of private investment in the same development. The government should not engage in research and development work which is being widely pursued by the universities or private enterprises, but the government should engage in such fields where effort is lacking.

It is by no means the purpose of this bill to reduce the present extent of government support for nucleonics. Such support can, in fact, be augmented by this legislation. What is actually aimed at is to channel it in such a way that it will not displace other substantial sources of support. The sum effect of this proposed legislation will be to provide conditions under which competition between brains and enterprise will exist and assure accelerated advance in all fronts.

"The establishment of a supernational world government is an old idea of pacifists. Such a world government is not needed for the maintenance of peace, however, if democracy and an unhampered market economy prevail everywhere. Under free capitalism and free trade no special provisions or international institutions are required to safeguard peace. Where there is no discrimination against foreigners, when everyone is free to live and to work where he likes, there are no longer causes for war.". . . . Ludwig von Mises, "Omnipotent Government" (Yale University Press, New Haven 1944)